

SEPTEMBER 1963



approach

THE NAVAL AVIATION SAFETY REVIEW

V 9 # 3



LOOKING without **BUSTIN'** or **NDT** **X-RAY** saves maintenance man-hours

How far can you PUSH a STOOF? A candid typewriter speaks out

Don't FIGHT It Yes, the **PROGRAM** has its shortcomings



Sir

Prithree

Vival

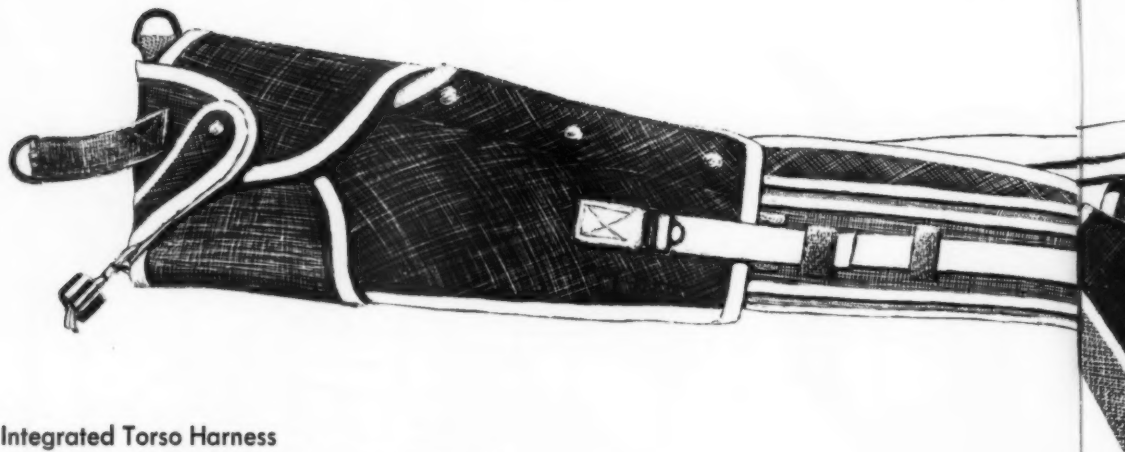
Described and Illuminated by

J.A. Bristow

1

with Herman N. Mills, PR1, Technical Consultant

◆ May I introduce myself? . . . Sir Vival . . . Dragon Hunters 1066. Betimes a verray parfait gentil knight . . . At other times a veritable tiger. 'Tis our heart's desire that ye may live long—an inspiration to ye fellowes, a scourge to ye enemies, and a continuing joy to ye happy dependents. Therefore, attend ye with all diligence to ye following pages ◆ ◆ ◆



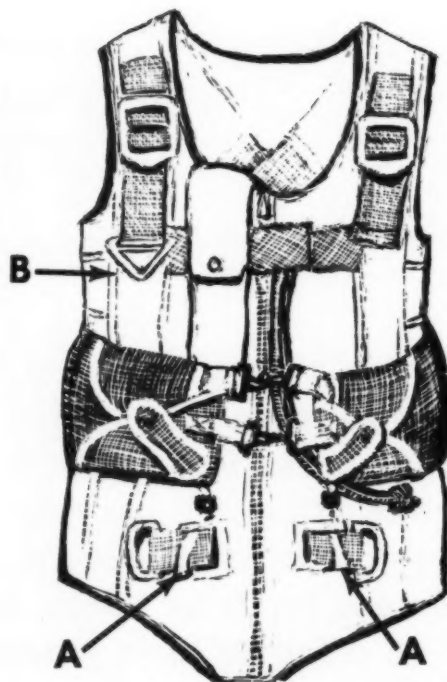
Integrated Torso Harness

Recently all torso harnesses have been modified (per BACSEB 12-62) to incorporate two lap belt support straps designed to improve survival kit retention (A). BACSEB 10-62 contains instructions for incorporation of a lift ring attachment for helo rescue (B).

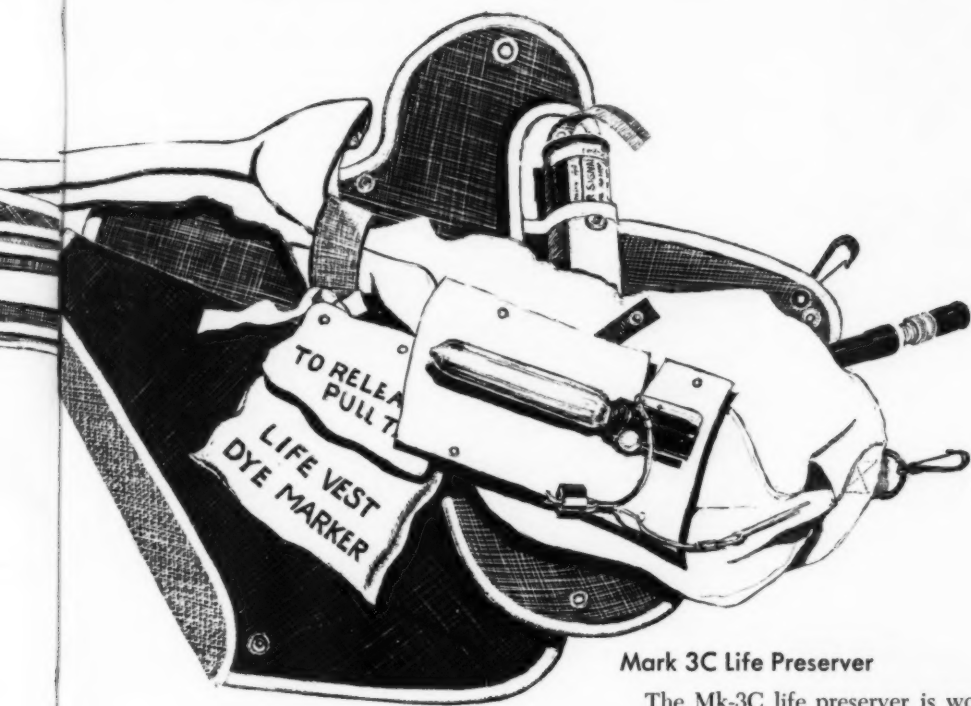
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In this drawing the survival knife sheath pocket is at chest level. (See January, 1963 APPROACH for other locations.)

During parachute descent, the PK-2 pararaft lanyard should be attached to the lower right rocket jet connector link. Various types of raft kits are used with the integrated torso harness: hard pack raft kit, high speed raft kit and a modified standard raft kit which is used with the TF-9J(F9F-8T) integrated system.



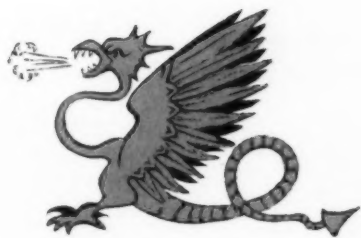
Ye Dedicated Fellowe



Mark 3C Life Preserver

The Mk-3C life preserver is worn with the integrated torso harness. Pulling the two inflation toggles on the front of the life preserver punctures the CO₂ cylinders which inflate the two separate inflation chambers. The chambers can also be inflated orally by means of the two oral inflation tubes. After oral inflation, the valves of the tubes should be locked. Standard survival equipment in the Mk 3C consists of two Mk-13 Mod O distress signals and two dye marker packets.

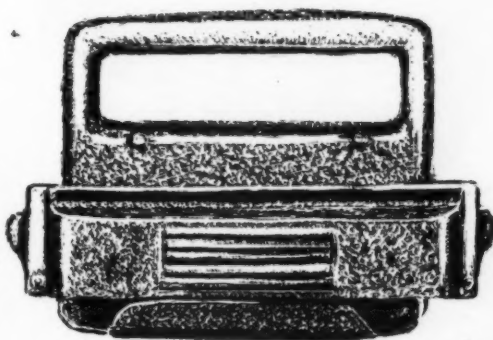
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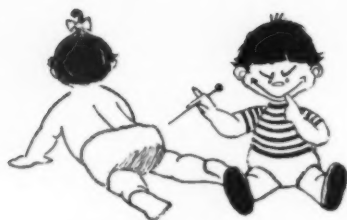
Ye Enemy

Rocket Jet Fitting

To release a rocket jet fitting, squeeze and lift. On parachute descent over land, release the canopy fittings as you touch down, then the hip fittings. Over water, release the lower left fitting during parachute descent so the seat pack will swing down around to your right for access to your para-raft lanyard. Release the shoulder fittings as you hit the water, then the lower right fitting.



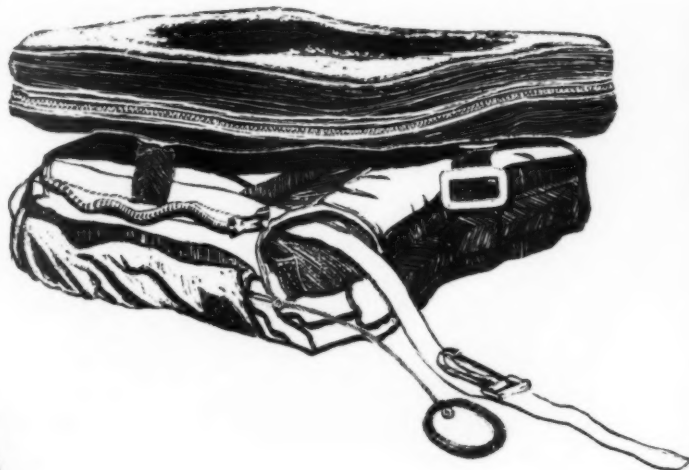
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Ye Happy Dependents

High Speed Paracraft Kit — Lanyard Hook-up and Inflation

Attach the PK-2 paracraft lanyard to the lower right rocket jet connector during parachute descent (refer BACSEB 14-61A). Raft inflation procedure is the same as with the standard kit (see below). The raft should be boarded from the stern (small end).

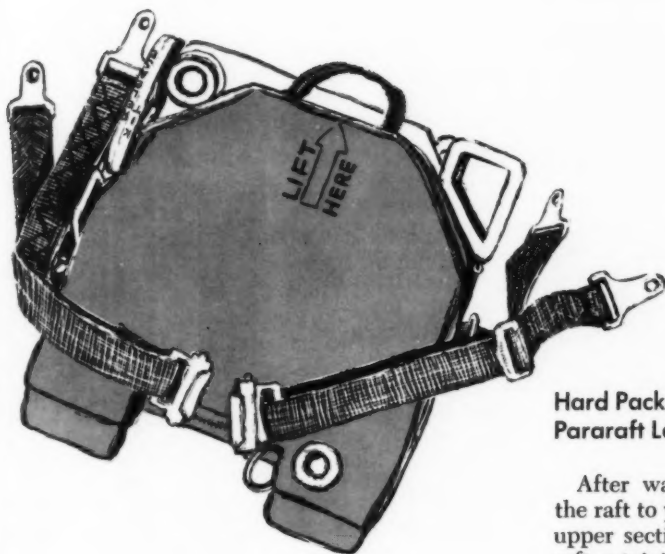


Standard Paracraft Kit — Lanyard Hook-up and Inflation

The standard raft kit is used with the non-integrated parachute harness except with the modified standard TF-9J(F9F-8T) integrated system.

The snap hook shown on the end of the lanyard should be fastened to the extended lanyard on the Mk-2 life vest prior to flight (see opposite page). During parachute descent, pull the kit out and let it hang from the lanyard. In the water, follow the lanyard until you reach the raft, then pull the inflation toggle. The lanyard merely retains the raft to the wearer. It is connected to the cylinder, not to the inflation toggle itself.

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Mark-2 Life Vest

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Thorough preflight of the Mk 2 life vest is necessary to make sure there is a good CO₂ cylinder in each container and that the container caps are screwed down tight after inspection. Unless the caps are tight, the cylinders will not be punctured when the toggles are pulled and the vest will not inflate. In case of failure to inflate or in order to obtain additional buoyancy, the middle compartment of the vest can be inflated orally by means of the oral inflation tube. When this is done the valve of the oral inflation tube should be locked.

An extended lanyard has been devised for easier detachment of the PK-2 life raft lanyard in the water. The detachable 6 to 8" length of webbing has a D-ring on one end and a snap hook on the other. Passed under the right parachute leg strap and lap belt, the lanyard rests on top of the wearer's right thigh where it can be reached easily for detachment.

Survival equipment on the Mk 2 life vest consists of two MK 13 Mod O distress signals, 2 packets of dye marker, 1 packet of shark chaser, a whistle, and a signaling flashlight.

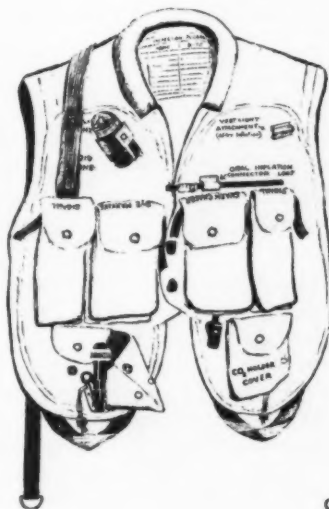


Home Sweete Home

Hard Pack Survival Kit — Pararaft Lanyard Hook-up

After water entry and parachute release, pull the raft to you by the drop lanyard attached to the upper section of the kit. Immediately attach the raft retaining line snap hook to either shoulder rocket jet fitting attachment point or to the rescue lift ring. Release the survival kit upper section from you and enter the raft. Keep the raft retaining line secured to you at all times until rescue.

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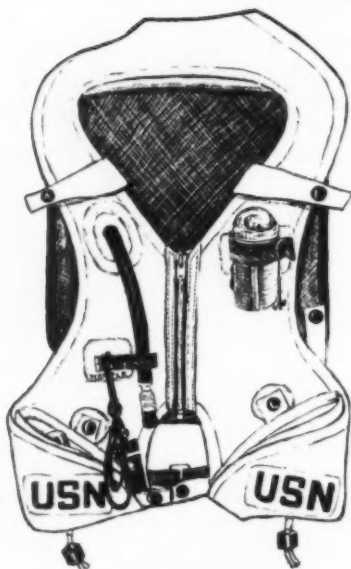


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Mark-13 Mod O Distress Signal

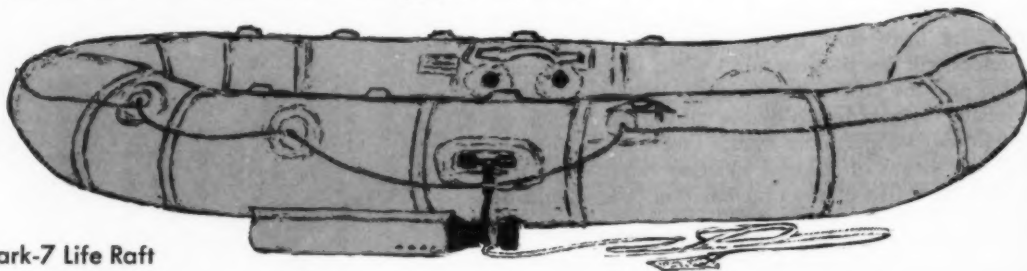
Even in total darkness you can distinguish the night end of the flare from the daysmoke end by the embossed projections extending around the case approximately $\frac{1}{4}$ inch from the end.

To ignite either end of the signal, tear the paper cap off the end to be ignited. Then point the signal to be ignited away from your face. Fracture the seal by levering with your thumb under the near side of the ring with your forefinger on the top far side of the ring. When the seal snaps, remove the seal with a quick pull from the container, thereby igniting the signal. Hold the signal up at arm's length, 45 degrees from the body. On rare occasions, the day-smoke signal will flare. Submerge it momentarily in the water and the smoke will resume. After using one end of the flare, douse the signal in the water and save it until the other end has been used. Burning time is approximately 18 seconds.



Mark-4 Life Preserver (worn with full pressure suit)

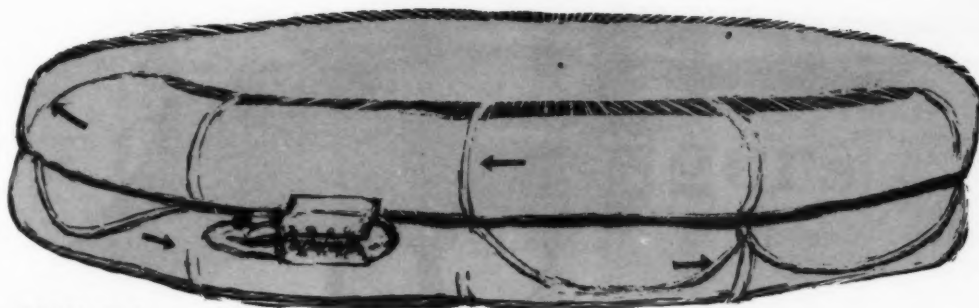
Standard equipment on this life preserver is a signaling flashlight and a whistle. One compartment is inflated by CO₂ cylinders activated by pulling the two inflation toggles. The other compartment is inflated orally by means of the oral inflation valve which should then be locked. Preflight precautions discussed under the Mk-2 life vest also apply to the Mk-4.



Mark-7 Life Raft

The two inflation chambers of this boat-shaped hull are inflated by pulling a wire toggle connected directly into the CO₂ cylinder head. The actuating mechanism is visible at one end of the raft container; the actuator toggle is protected by a red canvas cover.

The Mk-4 raft is similar to the Mk-7 in inflation procedure. Both rafts can be topped off by hand pumps located inside the raft equipment containers. Both rafts have retaining lanyards and snaps located at the same end of the container as the inflation cylinder. The retaining lanyard should be connected to the extended lanyard on the Mk-2 life vest.



Mark-20 Life Raft

A circular raft, the Mk-20 has two buoyancy chambers, one on top the other with a floor suspended between. No matter which side is up following inflation, the raft is right side up. It has a throw out type carrying case with a retaining cord stowed in it. To inflate a raft packed in the case, locate the toss out lanyard in the end flap of the case. Snap the lanyard to your life vest D-ring, toss out the raft and jerk the cable release free of the cylinder discharge head. The raft will come out of the case and both tubes will inflate with CO₂. The raft can also be removed from the case and inflated manually through the raft mattress valves by means of the hand pump. For equipment aboard this and other rafts, see Safety and Survival Equipment for Naval Aviation, (NavWeps 00-80T-52.)

To inflate the Mk-12 life raft, lift the flap on the end of the case. When you pull the ripcord, which is similar to a parachute ripcord handle, you extract locking pins to open the container. Simultaneously this opens the CO₂ cylinder and the raft inflates. (BACSEB 35-59 refers.)

The Mk-4, Mk-7 and Mk-12 life rafts should be boarded by climbing over the top of the flotation tube, using the boarding handles. (See NavWeps 00-80T-52.) The Mk-20 raft has either a boarding station (deflated section of the flotation tube) or a boarding ramp (which is located on and attached to the main flotation tube) to facilitate entry into the raft.

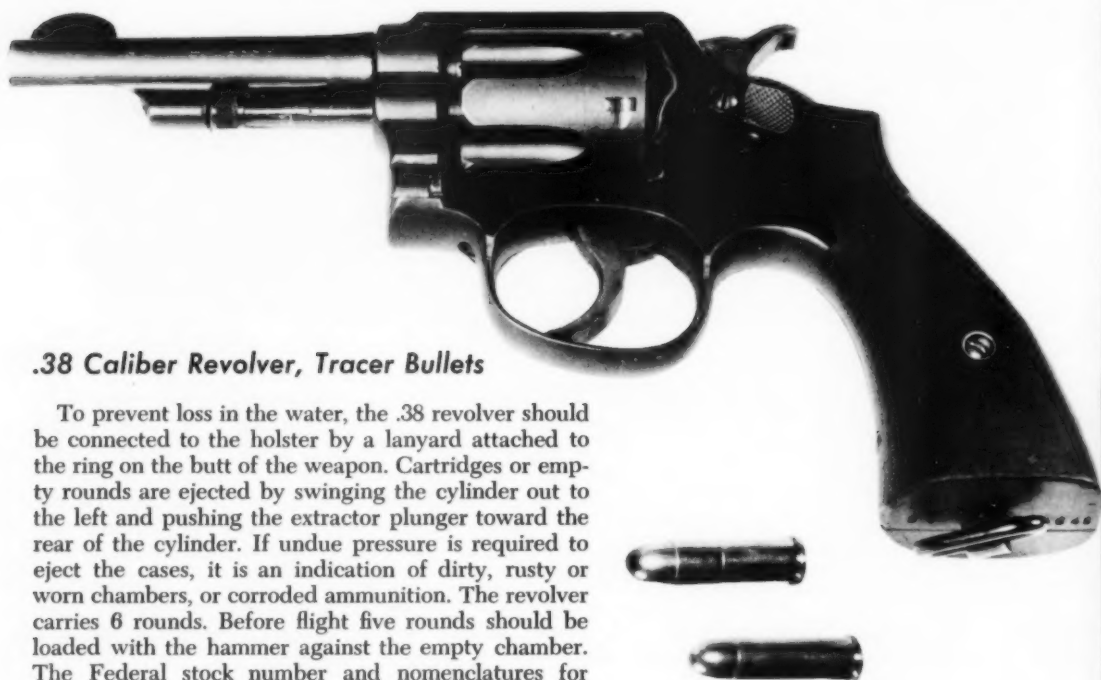


A13A Oxygen Mask

The most recent modification to the A13A oxygen mask is the new mask suspension system (P/N 33D1115-1), not yet available, to be used with the APH-6 helmet.

Perhaps the most important words concerning the oxygen mask are: Keep it clean. The recommended cleaning compound is Mil-C-18687 vice Mil-C-8638. BACSEB 27-54 is being revised to reflect this.

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.38 Caliber Revolver, Tracer Bullets

To prevent loss in the water, the .38 revolver should be connected to the holster by a lanyard attached to the ring on the butt of the weapon. Cartridges or empty rounds are ejected by swinging the cylinder out to the left and pushing the extractor plunger toward the rear of the cylinder. If undue pressure is required to eject the cases, it is an indication of dirty, rusty or worn chambers, or corroded ammunition. The revolver carries 6 rounds. Before flight five rounds should be loaded with the hammer against the empty chamber. The Federal stock number and nomenclatures for tracers is: Cartridge, cal. .38 tracer, Special Jacketed 1305-301-1692-A406.

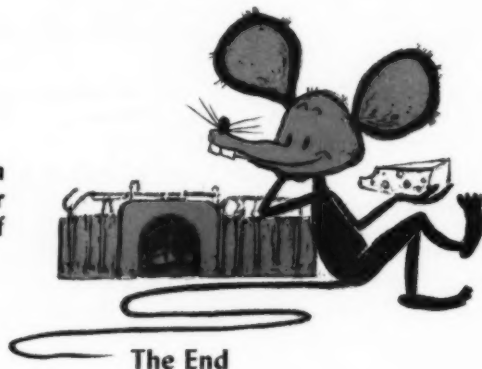
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SPACE limitations have restricted this article to most universally used and relatively uncomplicated items of personal survival equipment. (Previously covered in *APPROACH* were the anti-exposure suit, November, 1961; the full pressure suit, January, 1963; and the anti-G suit, March, 1963.)

In passing it should be noted that there is now a new shorter-blade survival knife in the supply system. Presently under evaluation are a pencil flare gun (See *APPROACH*, July 1963, pg. 22) and several strobe flashlights. The latest products of helmet development are the APH-6 and the SPH-2.

The continuing program to improve pilot's and crewmen's personal survival equipment goes on. But as we've said many times before and probably will have to say again, survival equipment is only as good as its user.

The best personal survival equipment in the world cannot function to save your life if you do not have it with you or if you do not know how to use it.



The End

Maneuvering at low altitudes on black nights will continue to make the ASW game an exciting but critical one. How far can you push the Stooft?

Cautious Tigers

by LTJG R. E. Farrington

"What the H— happened to One-Five?"

"I dunno . . . he was just forward of the port wing a second ago. It's so black out there I can't see anything."

Three hours later the crew of One-Five was high-lined from a destroyer back to their carrier.

While still in a state of semi-shock, the four airmen were hurried down to sick bay where their cuts and gashes were expeditiously treated. Word was sent to the Admiral and Captain that all survivors were in fair shape. Within an hour both pilots and the two crewmen were seated in the ready room writing and dictating facts to the squadron safety officer. He wanted all the details from start to finish.

What attitude did the aircraft strike the water?

Where did the aircraft break in two?

Did anyone experience difficulty in their escape procedure?

Were all the engines and instruments operating properly?

Did they experience vertigo at any time?

Did you eat dinner that night?

Were your boots laced to the top? . . . and so on.

With all the facts in triplicate, the safety officer relaxed, lighted a cigar, and told the pilots that, by all rights, rules and statistics, they should be in one thousand fathoms of water with their demolished aircraft . . . one hun-

dered percent deceased.

Four lives were miraculously spared by fate but a million bucks worth of Grumman *Tracker* was deposited in David's locker. One-Five was the second member of a two plane ASW team tracking a submarine with MAD. The copilot, with 700 hours, was in the left seat. The plane commander was acting as duty scribe in the right seat. He had accumulated a little over 2000 hours in type. Both were NATOPS standardized and had been flying together as an ASW team for over six months. With this combination of experience the aircraft still managed to stall, spin, lurch and fall inverted into the grasp of the unforgiving sea. Can it be blamed on the massive mounds of paperwork that an ASW copilot is required to maintain? In this case, no!

What happened to One-Five? Will it happen again? What can we do to prevent its re-occurrence?

One-Five was a victim of *Bernoulli's Principle*. He was a victim of *CLmax*, sea level density, load factor, lift, drag, angle of attack, airspeed and mostly his own ignorance. To complicate matters, the night was as black as they are usually described at Happy Hours.

Both engines were operating normally, all instruments were in perfect working order and both pilots had eaten a hearty

dinner. In addition to these factors, both pilots had their boots laced to the top, were happily married and had no problems, financial or otherwise. At this point, you as the reader, might question the validity of this story. It has occurred in the past and will happen again in the future. The remainder is left up to your imagination.

Since you are most likely an aviator of some type, the term *CLmax* is familiar to your ears. If it isn't, ask your safety officer. He was paid twenty-two dollars a day at USC to learn this plus much more. You hear the term in APMs, read about it, see it on bulletin boards and thrash it about at Happy Hours. It is in most aeronautical publications dealing with basic aerodynamics and flight. If you are a student you should be learning that *CLmax* can kill you instantly if not handled with particular care. The brother of *CLmax* is *STALL SPEED (Vs)*. Together they go hand-in-hand, tripping gleefully down a path of lilies waiting for someone to offend them. You may be able to verbally define these terms but if you are not aware of the contributing factors, you already have one foot in the grave. These terms have a direct effect on your aircraft's limitation, regardless if it is a Beechcraft or *Phantom II*.

Now let's discuss aircraft limi-

tations and combat effectiveness. Begin with the aggressive tiger pilot that exceeds sixty degrees angle of bank and lets his indicated airspeed dwindle below that which is depicted in the Stall Calibration Airspeed in his flight manual. He stalls his machine and goes home in a pine box. Then we have Cautious Cal who launches but refuses to exceed 30 degrees angle of bank . . . even with excessive airspeed. As a result, his mission is incomplete.

In time of war the tiger would be useless since he is dead. Cautious Cal is alive to return to where his carrier had been sunk by the submarine he couldn't catch. In this case, Cautious Cal came out the luckier of the two since he is still around and may someday return to an outfit and a chance to learn the aircraft limitations.

10 An ASW pilot is trained to eventually destroy the enemy submarine force. The advent of the high speed boats has brought on the need for a general increase in pace of ASW tactics. Maneuvering at low altitudes will continue to make the ASW game an exciting but critical one. The re-visit time will have to decrease in order to maintain contact. This means steeper angles of bank at greater airspeeds in order to cover more area. The same principle applies to attack and fighter pilots

as well. Now we are back to the barrier of aircraft limitations and caution.

Place yourself in a lone *Stoof*, three hundred miles from your carrier. You have a high speed boat in your grip. The tiger instinct in you blooms. How far can you push the *Stoof* (at prescribed NATOPS airspeed) in angle of bank? What about CL_{max} ; V_s ; load factor; aircraft weight; density; and altitude? Then you must remember, "Safety is Paramount" is tattooed on your left forearm.

The S-2 (S2F) weighs about 21,500 at this point and you have no external stores. For every 1000 pounds increase in weight (internal stores) there is going to be a 3-knot increase in stall speed. With 2000 turns, 28-30 MAP and no flaps, your airspeed will vary between 140 and 150 indicated. For you thrust bucket pilots, this is about mach .25. Using the formula

where V_{sa} is the stall speed for a certain angle of bank, V_s is the stall speed with the same configuration and power setting, straight and level. At 45 degrees angle of bank, stall will occur at 94 knots. With 60 degrees angle of bank, the stall will occur at 112 knots. I doubt that these limits will be used in ASW problems but they could come in handy someday if you find yourself at the end of a canyon with a wingover being the only

way to salvation. The formula agrees with the manual within one knot. We can thank the flight test people for these fine figures.

The pilots' handbook (Flight Manual) is a result of hours of difficult research, ground and flight testing and thousands of highly skilled man-hours. Millions of dollars and many lives have also been invested in this Manual. The very first page states, "To be read by all pilots operating these aircraft" "Of paramount interest to pilots." Your copy will do you little good buried beneath the paraphernalia and trivia that has collected in your locker. It's there for your use . . . the revisions are distributed for your knowledge and interest.

If a pilot is unsure of himself at low altitudes and high angles of bank, then he should take a long look at his manual. Consult the safety officer . . . these things may save a crew's life. Remember, the aircraft you fly was designed and tested to meet rigid mission standards. I'm not stating that you attempt to reach these limitations as a matter of practice, but you must know and be familiar with them. Know what the aircraft is capable of performing under various conditions and configurations. It may someday save your life. ●



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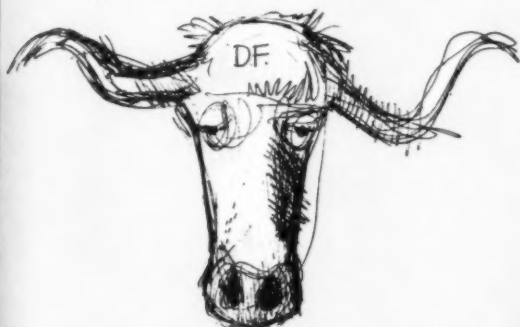
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THE WALKING DUCK AND THE FLYING HYENA

ONCE upon a time there was a duck and hyena that ran an airport. Because the duck was a bird, he took care of the flying and of course the hyena ran the tower, GCA and approach control, 'cause he was a natural born laugher. As you well know it takes a sense of humor to work with flyers. Over the years their operations got bigger and bigger; the duck flew higher and faster and the hyena bought more telephones and a D. F. steer (who was off his feed).

The more they became specialized, the less they saw of each other. In fact, they even forgot they belonged to the same air patch. Every time the duck called for landing instructions, the hyena never seemed to answer right off. Assuming that he was alone in the area, the duck asked for all



kinds of things and was known as a real quack on Guard Channel.

The hyena and the duck never got together to discuss what "I'm putting your clearance on request" meant. Everybody got burnt up and to help solve the problem, resorted to sarcasm. Such sayings as "the field is closed, what are your intentions?" were answered by "I plan to cry a lot." One day the duck and hyena thought they knew so much that they changed places. The hyena busted his tail, of course, and the duck strangled to death in the telephone cords.

Moral: Why not take a duck up in the tower and laugh it up a bit? You might be surprised at the problems they have up there! ! ! ! !

—Kelly Newsletter

'Don't Fight It!'

By Captain H. C. Ivy, USMC

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Recently the Naval Aviation Safety Program has become the object of increasing attacks from those who support the idea of combat-readiness as paramount.

These people are categorically correct. Combat-readiness is the most important and only final product that can be accepted from any combat organization. The error so frequently made, and a serious one, is to compare aviation safety and combat-readiness in opposition to one another. This position expressed or implied by responsible people in Navy and Marine Corps Aviation is creating disharmony which is hindering the safety program as well as effecting a loss in combat readiness.

Such comparisons, whether pro or con, is losing sight of the basic objectives of the program and in general confusing the issue. It is time that we all stop for a serious look at safety and bring the program more keenly into focus.

The Intent of Safety

To draw a comparison between aviation safety and combat-readiness is to compare the whole with a part of the whole. They are not opposite poles of a single issue and of this we must be ever mindful. Combat-readiness in aviation is that characteristic of a man and a machine combina-



tion that, when molded within a framework of organization and training, produces an aggressive and effective instrument of war. The molding of the man and machine combination within this framework utilizes various techniques, one of which is aviation safety. Aviation safety is unique among these techniques since it permeates all others. Anything associated with the man-machine relationship is associated with safety. But this association does not imply that safety is in opposition to any of these techniques. Aviation safety is contributory to and part of combat-readiness. When and if it is not contributory it is no longer aviation safety and should not be labeled as such.

OpNav Instruction 3750.14 outlines the general Naval Aviation Safety policy. One of the first meaty sentences we come to when reading this safety instruction is, "The primary function of Naval Aviation is the maintenance of a high degree of readiness for prompt and sustained combat operations." The very last sentence of this same instruction states, "Safety is not an end in itself, but a high state of readiness is characterized by accident free operations." Safety here is defined as a characteristic of combat-readiness. It is not an end in itself but a means to another end, namely a higher degree of combat-readiness.

Command Organization

Now that we have defined the position of aviation safety as related to combat-readiness, let us not be so naive as to believe that this settles the issue. As some opponents of the system have so aptly put it, the tail can come to wag the dog. These doubters do not, and this should be carefully considered by all, disagree with the basic objectives of the program, but contend that when met face to face in actual practice it is not so palatable. Now let's get right down to the nuts and bolts of it and see if the tail is actually wagging the dog.

One aspect of the Naval Aviation Safety Program, which seems to stick more often and securely in the craw of the program's opponents, is the position of the aviation safety officer in the organizational chain of command. It is feared that due to this arrangement, the safety program usurps command prerogative. Supposedly, the safety officer, by means of this position, exerts undue influence upon the commanding officer. But the safety officer can exert no more influence than can

be supported by honest and factual issues developed into logical conclusions, regardless of his position in the organizational chain of command. The reason behind his position at this level of command as a staff advisor is the very nature of the safety officer's responsibilities. It is often suggested that he should work within the framework of the unit's operations section. This is not feasible.

Let's go back to the man-machine concept expressed earlier. The operations section is given the responsibility of training the pilot to effectively utilize this machine towards the man-machine role of combat-readiness. The safety officer is for obvious reasons vitally interested in this endeavor. But at the same time the maintenance section of the unit is given the responsibility of training ground personnel to effectively maintain this machine so it may be capable of attaining the man-machine goal of combat-readiness. Again the responsibility of the aviation safety officer lies squarely within this field of endeavor. Clearly, the logical position for this responsibility lies at the next level of command. Since neither the commanding officer nor the executive officer of most units have the time to perform such duties, a staff assistant is required. Granted we could appoint a maintenance safety officer and an operations safety officer but since these efforts must often be coordinated it would require a third safety officer to perform such functions. If the Naval Aviation Safety Program is, as many contend, under the influence of Parkinsons' Law (bureaucratic growth), it seems that the above would long ago have been recognized as a happy solution. To summarize, if you consider how many maintenance man hours are required to produce one flight hour in our modern day aircraft, it will become readily apparent that we are doing more with our machines than merely flying them.

The Accident Rate

Many say that statistics can be arranged to prove anything. But this statement should be rearranged and more clearly state that statistics can be arranged to appear to prove many different things but can actually prove only one thing. Two and two equals four no matter how we arrange it and just because we usually deal with a greater number and variety of figures in statistics does not alter this basic numerical truth. If statistics are

examined closely, with a clear understanding of their intended meaning, they do not lie.

One complaint that confronts us, when attempting to present through statistics a historical picture of the progress in aviation safety, is that the standards of classification have changed through the years. Since, in fact, the yardstick of accident classification has changed this contention appears quite legitimate. But there are other factors. The yardstick has changed due to necessity created by other changes, for instance, the aircraft we fly. But let's look at the question from another angle based upon standards that have not changed and in all likelihood will not. A dead man as defined in 1936 is identical to a dead man as defined today. Along with this first reasonable premise we must accept one other proposition. The prospects of human survival during the crash of an F-4B (F4H-1) are not the same as we would expect if a machine of 1936 vintage were being crunched.

Remember we are not comparing the relative airworthiness of the birds but have assumed the advent of the accident and are comparing the likelihood of survival. Granted, the improvements in escape systems have tended to balance the scales but when we consider the environments of altitude and speed to which a pilot is exposed today it hardly seems a fair trade. The birds of today move faster, hit harder, and burn hotter. When we take into consideration night carrier operations and water temperatures that allow human life measured in minutes, it becomes obvious to any reasonable man that the problems confronting survival today are greater than they were in 1936.

With this in mind, it follows that the Fatal Accident Rate would have increased unless we are in fact having less accidents per flight hour today than we were in 1936. Notice that we are using the Fatal Accident Rate and not the Fatality Rate so as to avoid any arguments concerning the number of warm bodies in crash-1936 as compared to warm bodies per crash today. Actually the record shows an improvement in the Fatal Accident Rate, with the 1962 rate only 71% of the record as shown for 1936. Now remember these figures represent dead men, an item extremely difficult to reclassify. For those who might think a comparison between 1936 and 1962 unfair, since that era may be considered as the "dark ages" of aviation, a more up to date comparison might prove interesting. The 1936 rate compares more favorably with 1962 than any year from 1951 through 1957. As a matter of fact, the rate from 1941 until 1957 exceeded the 1936 rate with the

exception of 1949 and 1950.

These comparisons are between a type or classification of an accident. It is the same as a comparison of major damage or minor damage accidents of the two periods except that we are discussing a type accident that certainly could not have been redefined through the years. Considering the radical changes in aircraft through these same years, it would have been an accomplishment to have even maintained the same rate. This all means that the improvement in the accident rate is a real improvement and not something brought about by altering our definitions. But having shown an improvement in the accident rate let us not make the mistake of placing more emphasis upon it than it warrants. The accident rate only provides us with part of the picture, it is still that part of the whole. Remember, safety is not meant to be an end in itself; therefore reducing the accident rate is not our final objective, combat readiness is. Safety is a means to an end and the accident rate is a measure of that means but does not give us conclusive evidence of having reached or come closer to our final objective.

Combat-Readiness

A historical comparison of combat readiness is unnecessary. The Naval Air Arm is immeasurably more lethal today than yesteryear. If there has in fact been a negative influence by safety upon this advancement we have no real means of measuring this influence. But there have been some very real and measurable positive influences upon this advance to which we should give full consideration.

Strangely enough, the very technological improvements for which the safety program can in part claim credit are brought forth in arguments against aviation safety. These improvements are often put forth as the real reasons for the reduction in the accident rate for which the safety program publicly claims credit. Such things as the angle deck mirror landing system, ground level ejection systems, better radar, to name a few. Or in another vein, more stabilized man power within units, phase readiness, unit rotation, NATOPS. . . . The contention that these things have made flight operations a more reliable, effective, and safer endeavor is well taken. But how much of this was given birth in an atmosphere of interest for which at least in part the Naval Aviation Safety Program was responsible? How many of these technological advances were speeded to the fleet through interest in them at the Naval Aviation Safety Center? Through what program did

the realization of the need for NATOPS come clearly to the forefront? How many improvements in the reliability of aircraft systems are a direct result of thorough analytical investigations of minor and major aircraft accidents? These things are in fact the real and measurable positive influences that the safety program has had upon the advancement in the state of the art. They are the concrete evidence of increased combat-readiness for which the safety program can in part claim credit.

It is often said that certain people use the safety program as a basis or a crutch to restrict realistic flight operations. Now let us ask, did these people come into being along with the current safety program or is it possible that they existed long beforehand? We can be sure that they are not new on the scene and if they could not scream SAFETY they could find some other less clearly defined issue to champion. Actually, aviation safety should discourage such influences if practiced intelligently because it would bring the issues more clearly into focus by presenting the facts of the case. If we *all* were as avid members of the aviation safety program as these "Cautious Charlies", they wouldn't stand a chance. If the safety program has been misused as a tool to promote unrealistic training practices, it's our own fault. When procedures are proposed which restrict realistic training, our reaction is all too often to accept it with a grumble and consider it as another pain in the posterior forced upon us by the safety program. Our reaction in such situations should be to jump right in the middle of the issue with both feet, become as fully informed on the subject as the promoters of the practice and offer a more realistic solution to the problem. Quite often the proposals are honest suggestions presented in good faith by an overzealous safety officer, who doesn't invision himself and certainly is not infallible. The system needs and does have some checks and balances and we are all part of it.

It should be remembered that the safety program was conceived and developed from within the Navy and Marine Corps. It was not given birth outside and shoved down our throat. What the program is or ever will be depends upon the attitudes and actions of every single naval aviator. The program is not impervious to change but the program itself is inert and only demonstrates dynamic features injected into it by people. Those people can be "hard chargers" as easily as they can be "Cautious Charlies".

In War and Peace

There is one serious misconception concerning safety which oddly enough is voiced by many in the pro-safety camp. This is the view that safety is paramount in time of peace, implying that it has no place in time of actual combat. War should intensify interest in safety just as it does in aircraft availability, training level of pilots and crews, training level of maintenance personnel, aircraft turn-around time, expeditious loading of ordnance, or in short, combat-readiness. If we say that safety enjoys a place of paramount importance in peacetime but takes a back seat to combat-readiness in time of war we are picturing the two as opposites. To state things thusly is to admit that safety is considered paramount to combat-readiness at some particular time and under certain circumstances. When and if this condition prevails we must certainly admit that the tail is in fact wagging the dog.

Conclusions

The Naval Aviation Safety Program has a lot of problems and shortcomings but then again what program hasn't? In spite of its shortcomings any reasonable person will admit it has done naval aviation immeasurable good in comparison to the harm for which it may be held responsible. The potential of the program if given the active support of all naval aviators would be beyond comparison with what has already been accomplished. Too many people react by withdrawing their support of the program when they find something disagreeable with the administering of it. They withdraw and criticize from without when instead they should choose these times to get even more deeply involved in the program and get it back on the right track. All too often the people who find themselves disgusted with safety are the people the program needs most seriously, the hard chargers who are also blessed with the experience and insight to get to the basics of a problem and come up with a realistic and workable solution. There seems to be agreement among all aviators with the basic objectives, the disagreements arise in the day to day administering of a system to reach these objectives.

Remember the program itself is inert and whatever life, motion or direction it demonstrates is merely a reflection of the people who are involved in it. If *You* haven't been actively involved, start now. Considering what it has done without you, can you imagine what it might accomplish with your active support?

I took off at 1830U following a normal preflight and turn-up. After release from departure control at 8000 feet and 22 miles, I switched over to channel nine on the tacan and immediately picked up the ship ahead at 72 miles. At this time I went to button 11 on the UHF and gave strike control a call. The ship answered immediately and gave me a marshall of 140 degrees, 35 miles at 20,000 feet, and an EAC of 1901. I entered holding at 1845 and shortly thereafter I switched to button 15 and received a new EAC of 1906 and reported my fuel state as 7000 lbs. At 1906 I called leaving marshall and commencing my approach. The ship acknowledged my transmission and gave me a final inbound bearing of 275 degrees. At this time I commenced dumping the remaining fuel in my wings, keeping 4800 lbs. internal, which would give me a max of 4000 lbs. at the ramp.

When I reached 11,000 feet at 20 miles I was told to set up a

scending to 600 feet.

As I approached the ship I could see that the lens was not turned on nor was there any runway deck lighting. At this point, CCA told me to climb to 1000 feet and continue straight ahead. I pulled up my gear and went to maximum conserve because as I passed over the ship I could see the deck filled with aircraft waiting for launch and knew it was going to be a long wait. I am unsure of the number of orbits I made, however twice the controller told me to dirty-up which I did, and twice to clean up and conserve, which I also did. The time elapsed was about 15 minutes over the ship.

(The first plane on the port catapult was unable to receive an initial start due to a faulty start vehicle. As the vehicle was changed and the start accomplished the launch continued, using the starboard catapult. The aircraft on the port catapult continued to cause delays and was eventually removed. The

I brought this fact to the attention of the controller and was advised that I was being dogged again. Fuel state was now in the vicinity of 2500 lbs. At this time I again requested Bingo information and again received a "Roger."

After several trips around the ship I finally got to try another pass. This pass resulted in a bolter and a slightly hard landing. I called low state abeam, 1500 lbs. and again reminded the ship that I had received no bingo information and for the third time received only a "Roger."

At the 90 I checked my brakes and found the port brake pedal was bottoming out quite rapidly, indicating that I had absolutely no port brake. I informed the ship of this and told them I would have to be towed out of the gear. My pass looked good all the way; however, I didn't catch a wire and bolted again. *(Weather was good but the sea state caused a pitching deck.)* The pattern that the controller kept me in around the ship was extremely wide and long, causing an extremely long final. Each pass was costing in the neighborhood of 4-500 lbs. of fuel.

As I turned through the 90 on my third pass and reported my fuel state as 1100 lbs., the ship told me to clean up, shift to channel 12 and climb to 20,000 feet overhead for refueling from the tanker. The gear would not come up, in fact the gear remained down and locked with the handle in the up position. *(The landing gear had been damaged on the first bolter but the word was not passed to the pilot.)* Since I could not climb to 20,000 feet, the tanker was directed to descend to 2000 feet and rendezvous with me. The tanker did an amazing job, for

WET or DRY

"Dog" pattern. At this time I inquired as to what my bingo field and fuel were and received the reply, "Roger, Wait." I promptly ceased dumping and my fuel state was 5100 lbs.

After making 3 orbits in the Dog pattern I was cleared to take up a heading to make the inbound radial which had changed to 285 degrees, and continue my approach. I called 10-mile gate, and was told to dirty-up and reduce to approach speed. At the six-mile gate my fuel state was 4200 lbs. and I continued the approach, de-

ck was cleared for landing at 1930, 24 minutes after the Demon commenced its penetration.)

As I came around on my first pass, contact was established with the LSO and everything was normal. However, at the last minute I received a waveoff and was steered around the pattern on an extremely long and wide downwind. *(The waveoff was given because of an erroneous setting of the arresting gear.)* Instead of turning me onto final I received a heading which took me inside the ship's course.

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before I had done barely $\frac{1}{4}$ of an orbit he rendezvoused with me. The ship gave us a refueling heading of 110 degrees which would head us towards the beach. The tanker pilot had some difficulty extending the drogue but he finally succeeded in getting it streamed.

Although I had never plugged in at night before, I experienced very little difficulty and made a successful hook-up on the first pass.

I had some trouble keeping the drogue pushed in far enough due to the excessive drag on the aircraft with the gear down. I asked the tanker to give me all he could spare, and he said he could give me 2000 lbs. The store was not transferring properly and after several attempts to obtain fuel the evolution was abandoned. At this time I was 125 degrees, 27 miles with a fuel state of 800 lbs., 300 lbs. of which were in the wings and unable to be transferred.

A *Skyhawk* reported being over the divert field and informed me that the tower was ready for operations but to be careful as the field was covered with fog. I asked him to find out if the arresting gear was rigged and he replied there was no gear. My DME read 32 miles from the ship and I was 27 miles from a field which was covered by fog. I had to make a decision whether to go back to the ship or land ashore with no field arresting gear and no brakes. If I had been able to raise my wheels I would have landed ashore. However, I could not, so I made an immediate decision to return to the ship. I called and told them I was coming back. I was at 5000 feet, fuel state was 500 lbs. with 23 miles to go.

The gear hanging down was

causing excessive drag and was requiring a very high power setting to maintain 180 knots so I commenced a gentle descent which increased my airspeed to 200 knots and allowed a reduced throttle setting. At 13 miles I registered 300 lbs., 2500 feet and 200 knots. I knew at this time I wasn't going to make it. I advised the ship that it would be a straight-in, one time shot and a pullup and eject if I bolted.

When the DME indicated three miles I had slightly less than 200 lbs. I saw lights dead ahead and I thought it was the ship. I called and said they were lit up like a Christmas tree but could not see the runway. As I approached the lights I could see it was an excursion ship of some sort. Fuel state was now 100 lbs. I commenced to climb from 700 feet to about 1200 feet and continued toward the ship. At two miles, I saw a plane guard destroyer, fuel gage was now reading ZERO. I reported seeing the ship and at the same time they told me to eject. *(When the aircraft was one mile astern, the ship entered a fog bank which reduced horizontal visibility to almost zero.)*

I informed the ship I would be passing down the starboard side and ejecting on the starboard beam. My altitude was 1200 feet, I did not want to go higher because I didn't want to spend too much time in the descent and be blown away from the ship. I positioned myself in the seat, pulled the face curtain and was rewarded by a resounding "Bang." I sensed passing through the canopy and the seat turning over me. I also became aware of a tremendous pain in my back. The chute popped open and the pain in my back was extremely bad and I

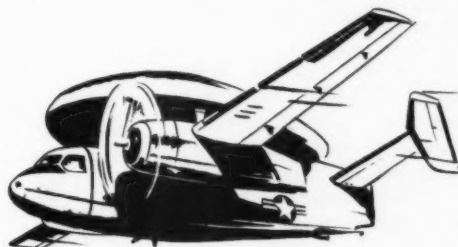
couldn't get my breath. I saw the ship about $\frac{1}{4}$ of a mile away but all I could think of was getting into the water to relieve the pressure on my back.

When I hit the water I recall going under momentarily, and at the same time I pulled the life vest toggles. The vest inflated immediately and I bobbed to the surface. I had no trouble disengaging the rocket fasteners to the parachute and I slowly paddled away from the chute so as not to get caught in the shroud lines. I could hear the aircraft overhead but I was too preoccupied with inflating my life raft to give any notice.

Once the raft was inflated and I had climbed in, I proceeded to hook up the small guard beacon transmitter. The next thing I did was to light off a signal flare and begin firing my tracer pistol. After 15 or 20 minutes, an aircraft passed overhead and I fired some tracers past him to attract his attention. The plane continued making passes overhead so I was pretty sure I'd been spotted.

The entire operation was complicated by very thick fog. I could barely see the lights of the aircraft passing overhead. I could hear various ships' fog horns around me, but I had run out of tracers and flares so I simply threw back my head and screamed the loudest "HELP" that I had ever done. I followed this with loud whistles. I heard someone shout that they heard me, and could barely see a destroyer coming slowly toward my position through the fog. I had been in the water for nearly an hour when I was picked up by the destroyer's whale boat. I spent the night aboard the can and was transferred to the carrier by highline the next morning.

COLD SWEAT



ANYMOUSE SPECIAL

I was the aircraft commander of an E-1B (WF-2) on a flight from NAS Atsugi to MCAS Iwakuni. The crew included 3 other officers and a technician. We were on an IFR flight plan with IMC predicted for nearly the entire route but good weather at destination.

Minimum freezing level was predicted at 1000 feet and except for light rime icing the flight was uneventful until 90 miles from destination. At that position the port engine quit and was feathered.

Full power on the good engine failed to hold our assigned altitude and 1000 pounds of fuel was dumped. Still we could not maintain altitude. Three things then took place: (1) a Mayday went out, (2) IFF was switched to emergency, (3) a descent to 6000 feet was requested.

The lower altitude was refused because of traffic and we finally told ATC to clear all lower altitudes which they did. As we descended, still in the clouds, we began to pick up more rime ice. Outside temperature was minus 5°C.

With alternate air required to maintain a satisfactory carburetor temperature, some power was sacrificed and at 5500 feet we were still sinking. Minimum altitude was 5000 and I had made up my mind to order a bailout at that altitude. We didn't want to use the radar to determine our position because we were afraid the combined load of deicers plus radar would pull our remaining generator off the line.

At 5200 feet I spotted a valley through a hole in the clouds and could see up the valley to the coastline. Three small lakes forming a triangle gave us a checkpoint that matched the chart.

I let down through the hole and headed toward the coast. At the lower altitude and higher temperature the ice began to melt and fall off and we could ease off on the alternate air which increased available power. Now we had to dump more fuel to keep enough altitude to get across a 1500-foot ridge near the coastline.

Out over the water I was able to maintain 700 feet using maximum continuous power but for

fuel conservation I shortly came back to 100 knots with a lower RPM/MAP setting. We didn't have enough fuel remaining to continue on to destination with a safe margin so I elected to proceed to a Japanese civil field.

This field had 3900 feet of hard surface but only had VHF so we asked a P-2 (P2V) to contact them. He reported back that we were cleared to land.

There were numerous small coves along the coast which provided excellent ditching possibilities if the need arose so we hugged the shore. When the field came in sight both fuel warning lights were glowing and the gages were dipping toward the bottom. I headed for the nearest end of the runway despite a tailwind.

Touchdown was on the first 100 feet of runway at around 120 knots groundspeed. By using steady braking at first and alternate braking after the halfway mark I was able to stop on the hard surface. The engine was secured while rolling out. Both tanks indicated only 100 pounds remaining.

SPAD SPIN

All of us tend to forget basic things and this is a case where a 1500-hour *Spad* driver, who had long since decided he could make the old bird do things the designers never dreamed of, had to recall a very basic fact the hard way.

It was late in a WestPac cruise and the last big exercise was in progress. There was a lot of that old nothing-can-happen-this-late-in-the-game feeling. This Any-mouse was scheduled for a 4.5 hour hop to control close air support for several flights of A-4s (A4D) and A-1s (AD) from my own air group. I had 12 HVARs for marking and 150 gallons in each drop tank.

After a couple of hours in the target area, all routine stuff, a flight of A-1s (ADs) checked in for their period on target. Three successive targets were assigned and were given a working over. I was circling high over each of the targets and everything was going so well it was almost dull. My only problem was trying to spot all the hits.

The next target I assigned was on the beach at a point where the hills rose rapidly out of the water so I let down to 2000 feet and set up my spotting orbit to seaward.

The first series of runs on the beach went okay. On the second series the flight leader called "rolling in." I found myself headed away from the target and



in a poor position to spot hits. Therefore, I rolled over in a 60-degree bank to port, and at 130 knots popped the flaps.

"That'll bend it right on around," I thought. "No doubt about it, a quick 180 will do the trick. Just hold what you've got on the stick. Don't pull any Gs and stall."

It was a most surprised Any-mouse who found the nose pitching up rapidly as the flaps extended, and an even more terrorized mouse who suddenly found himself on his back as the plane stalled, went inverted and flicked into a spin.

Next, the nose dropped through and the bird was in a vertical dive as I stopped the spin with rudder. The stick was useless as it had no effect in any direction. At this point I observed large quantities of water dead ahead and closing rapidly, and I also began wondering about the wisdom of hard turns at low airspeed (and low altitude).

At about 500 feet that certain feel returned to the stick and I gingerly began easing back, quite conscious of the progressive stall preached by the training command. Bless them. At a somewhat unethical altitude of less than 100 feet the airplane was in level flight again.

We learned all that stuff about airspeed, angle of bank and stalls in "A" stage during primary training. We can't afford to forget it.



The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in ready-rooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

Buggy Top Tip

During the course of a 45-degree glide bombing run in an A-4C (A4D-2N) which was equipped with the complete thermal radiation shield, the buggy top slammed shut as I bottomed out on a 4G recovery. Wow, it got real dark in the office!

Knowing that I had started a climb straight out, I shifted hands on the stick, attempted to hold what I had, and started fumbling for the red panel light rheostat knob.

I didn't have much immediate luck so I shifted to the white floods and illuminated the cockpit with glorious light. Recovering from the 6000 fpm climb with airspeed passing 240 knots and decreasing, I trimmed for straight and level, then took both hands and opened the radiation shield.

Quarterbacking this incident, I could have engaged my autopilot since it was on standby. Altitude and heading hold modes would have straightened me out if I would have let pressure off the stick.

I also have two new resolutions: (1) an extra item on preflight is to make sure the clam shell is locked back, (2) keep white flood lights on full bright during all day operations; not only will this prevent such a frightening experience, but I found that the instrument panel is evenly illuminated and easy to see especially in LABS maneuvers when sections of the panel fall in deep shadow.

Ladder Storage

During a night refresher landing period on a Midway Class carrier the pilots would be required to switch while the aircraft were hot (turning up) and

were spotted abeam or aft of the island.

A loose A-4B (A4D-2N) entrance ladder had been placed just forward of elevator number 3 with a bag of tiedown chains on top of it. The elevator was down and an A-4B (A4D-2N) was spotted on it with a pilot just strapping in. In some way the ladder was blown free and it fell, hitting the *Skyhawk* below. Fortunately the ladder missed the pilot, plane captain and other personnel on the elevator.

For normal flight operations the ladders are stored forward of the island in a designated storage area. For this operation, however, the ladder would be needed after two landings and also the plane captain could not get forward of the island with his ladder due to the area being blocked with vehicles and turning up aircraft.



There was also considerable confusion as to where and when the pilots would switch. During the day refresher landings, pilots switched forward of the island but the plane captains were never informed. This particular night, again, the plane captains did not know when or where the pilots would switch.

The A-4 (A4D) ladders have always been a problem as to storage on this particular carrier and this mishap has instigated action to provide an adequate storage area forward and aft of the island. Presently all A-4 (A4D) ladders in this squadron are incorporating a small strap

so the ladder can be secured to a flight deck padeye when it is impossible to get the ladder to the designated storage area.

Varicam Murphy

The incident I am about to relate occurred in a P-2 (P2V) but it could happen to anyone in any aircraft.

A P-2 (P2V) was just out of PAR (paint and return) and I was scheduled to take it on a test hop. After a *thorough* preflight (much better for these first-flighters than my usual squadron type) I started up and taxied out. During the preflight I had verified the varicam (how's that for alliteration?) as a few degrees nose-up both on the gages and by the mark on the fuselage.

Then as part of the pretaxi check I ran the varicam (that's an elevator trim attachment in case you aren't checked out in the P-2 (P2V)) in one direction while the copilot stopped me with his control and the test bypass switches. Then I stopped him using the same procedures. All the while I was watching the indicator to see if the surface was moving.

After turnup and pretakeoff check, I noted the varicam was a few degrees nose-up and I pushed the switch to nose down—only to discover that the indicator went nose-up! The pilot's switch was wired backwards. In spite of my efforts I hadn't correlated my switch movement with the indicator movement.

This brings me to my "all hands" part of the story. It is real easy to mistake 180-degree out-of-phase action for the proper action. Have you ever moved the stick while watching the ailerons without thinking whether the control surfaces moved in the proper direction? ●



VIP's & Side Boys



22

Dear Headmouse:

The situation that I wish to point out is not new and perhaps has been reported before. However, my recent experience has convinced me that we have a potential tragedy with serious adverse publicity pending in carrier aviation.

I refer to what has become SOP whenever VIP's are scheduled to come aboard via helo. The unsafe condition develops when side boys, senior officers and spectators converge on the VIP helo as soon as it lands on deck. With helo blades turning and perhaps a scheduled launch turning up, greetings are exchanged and honors rendered.

NATOPS and common sense dictate that the surrounding area be clear of unnecessary personnel when helo blades are engaged. As the volume of VIP traffic increases it seems to me the probability of a serious and needless accident increases. Headmouse, it's going to take a top-dog to stop this but let's do it *before* tragedy strikes.

ANYMOUSE

► Once you have seen the results of shattered helo blades you'll never forget them. This mouse has and, to put it bluntly, it's a messy sight. Anymouse has stated very well the problem and the solution. Common sense dictates that the

surrounding area be clear of all unnecessary personnel when helo blades are engaged. Side boys on a flight deck under engaged helo blades are certainly unnecessary personnel.

Very resp'y,

Headmouse

Deck Launch Jargon

Dear Headmouse:

I would like to recommend the term "axial" not to be used between Pri-Fly, the flight deck officer and/or pilots. The correct terms should be "angle" for angled deck and "straight" for the axial deck in order to prevent a misunderstanding. Axial and angle sound similar and could become confusing during launches.

ANYMOUSE

► Your recommendation sounds like a good one. We hope other units will give it a try.

Very resp'y,

Headmouse

Night Headlight Covers for GSE

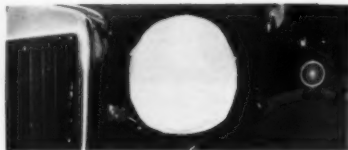
Dear Headmouse:

Removable headlight covers used by this command are considered satisfactory by pilots and ground support equipment drivers. They are easily installed and removed, depending upon the lighting requirements, and are also inexpensive to manufacture. The material used is a double thickness of green acetate cloth, stock no. DR8305-205-1002. Several colors were tried, this selection seemed best.

Because tractor headlights are recessed into the frame this type cover is not feasible. However, a circular cover, using the same material fastened between two pieces of metal with the centers removed works quite well. The outside diameter is 5 inches and the inside diameter is 4 inches. These covers are screwed in position just below the headlight so that it can be rotated up over the headlight and secured with a wing nut locking device. This cover can also be rotated down and fastened when it is not required.

M. E. STEWART
CO, VT-21
NAAS KINGSVILLE, TEXAS

► A recap of the letters on this subject indicates there is indeed a problem and many possible so-



Removable headlight covers of the type used by VT-21.

lutions. To date these include:

1. Anymouse of Hawaii: (a) Mask or paint top half headlight, (b) Auxiliary lights with red or amber filters, (c) Clearance lights independent of normal system.—P. 22 of May 1963.

2. LCDR D. T. Wallace, OP-503E: Green lens.

LT P. M. Besisle, CSVG-59: Red floodlighting or white dustpan lighting.

R. H. Luke, Douglas Aircraft Co.: Red bar lighting to indicate direction of movement.—P. 47 of June 1963.

3. LCDR D. M. Reedy, VP-703, NAS Dallas: Aluminum foil disc to diffuse light.—P. 22 of July 1963.

4. M. E. Stewart, CO, VT-21, NAAS Kingsville, Texas: Green acetate cloth covers.

5. W. R. Carver, AC3, NAS Brunswick, Me.: Diffused beam and headlight tilt.

Headmouse believes that any one of these systems might prove satisfactory. However, in the interests of standardizing lighting in all ground support equipment these suggestions are being forwarded to cognizant authorities for consideration. These efforts appear to be a step in the right direction. In the meantime, if you are using a better mousetrap, let's hear from you.

Very resp'y

Headmouse

Have you a question? Send it to Headmouse, U.S. Naval Aviation Safety Center, Norfolk 11, Virginia.

He'll do his best to help.

Instrument Approach Procedure Charts

Dear Headmouse:

Many approach plates have warnings printed on them such as "Maneuvering for circling approach south of the field not authorized due to high terrain." These warnings are of extreme importance, nevertheless they are printed in fine print at the bottom of the approach plate and are sometimes overlooked.

Back course ILS approach plates have BACK COURSE printed on them in large letters to insure that pilots realize that the plate is for a back course approach. Why aren't these warnings of such a manner that it would be impossible to overlook?

ANYMOUSE

► These high terrain warnings should not only be printed in large letters but might be printed in a different color as an attention getter. The fact that they are now printed in fine print and easily overlooked points out the necessity for diligent study of approach plates that might be used on a flight as part of the flight planning evolution.

Very resp'y,

Headmouse

Loose Cargo

Dear Headmouse:

I was a member of a Bingo crew being COD'ed off a carrier while deployed to WestPac.

In addition to seven passengers we carried several tool boxes, two A4 (A4D) wheel assemblies and an A4 (A4D) starter probe.

Our emergency procedures brief by

the plane captain consisted of just the location of where the emergency release handle for the life raft was located.

Upon touchdown at our destination I heard a loud bang in the rear of the aircraft. The starter probe had fallen over. None of the loose gear had been secured!

I wonder what would of happened if we'd had to ditch or return to the carrier and make an arrested landing?

ANYMOUSE

► You'd probably have had a lap full of tool boxes. There is always the possibility of a ditching and loose cargo can become deadly unguided missiles.

Headmouse

Fuel Foul-up

Dear Headmouse:

During the refueling of an HUP-3 (UH25C) the aircraft was inadvertently refueled with JP-5. The chain of events started when the Fuel Farm dispatched the wrong truck and during the refueling the plane captain didn't check to see if the right truck had been sent. It was finally caught by an alert person of another unit who saw the JP-5 truck leaving the heliport and called the proper people due to unusual circumstances. The plane was de-fueled and test flown with the proper 115/145 AvGas.

Since color code seems to be on the upward trend it would make people more conscious of things if the fuel trucks that contain jet fuel were painted a different color or had special markings. We were lucky enough to only submit an Anymouse vice an AAR

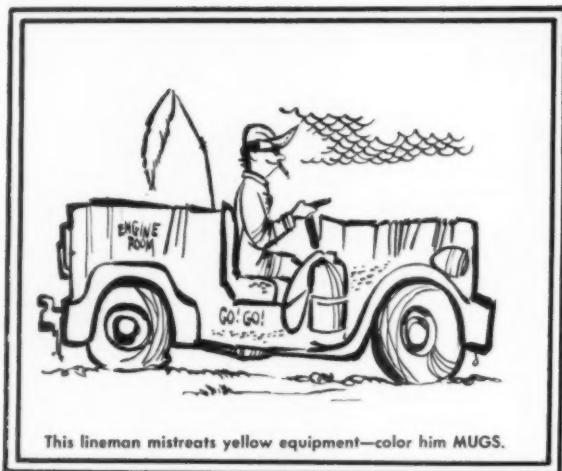
ANYMOUSE

► Color coding the truck is one solution. Since all fuel trucks are labeled, how about teaching the line crew how to read.

Very resp'y,

Headmouse

approach COLOR



This lineman mistreats yellow equipment—color him MUGS.

24



This pilot files VFR in marginal weather—color him IFR and help him land safely.



This girl's boyfriend likes to flat—color her MOURNING BLACK.



Contributed by:
LT C. Simpson
Assistant ASO,
CNRA

CRING BOOK

Not memorizes check lists—color him **WHEELS UP.**



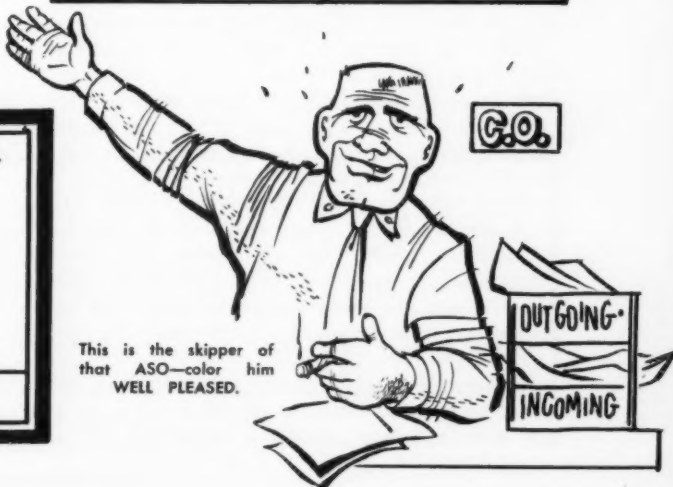
This ASO has an efficient and safety minded squadron—color him **TICKLED PINK.**

This pilot brakes excessively—color him **HOT** or **BLOWN OUT.**



This guy stands around on flight decks during operations—color half of him.

25



This is the skipper of that ASO—color him **WELL PLEASED.**

'You can fly them all Safely!'

by Commander Billy Carroll

Anytime two ferry pilots get together, hairy anonymous tales of flying are likely to be exchanged. A former safety officer of this squadron, LCDR Trygoe A. Hall, back in about 1945, decided this was a good gimmick to help his safety program. From this idea Anymouse was born. The Safety Center bought the idea and the little guy finally got on his way about 1953. He apparently is thought well of, to the tune now that the Anymouse Report is included as a report under the new OpNav Instruction 3750.6E.

As one might suspect, the ferry squadrons have unique problems, safetywise, which no other aviation activities in the Navy have:

First, they fly practically every type of aircraft the Navy has in its inventory; at this time, some 38 different model aircraft.

Second, aircraft flown run the gamut from brand new, through "safe for a one time ferry flight" in material condition.

Third, each ferry pilot, being qualified in at least five different types of aircraft, must carry checkoff cards plus flight and safety equipment for each aircraft he is qualified in, on every trip.

Fourth, the very nature of the operation requires that the ferry pilot end practically every hop at a different field, with its peculiar traffic patterns and layout, and includes many overseas ferry flights to, or through, foreign countries.

Fifth, the ferry pilot is seldom able to utilize his own squadron personnel for servicing, preflight or repair of an aircraft being ferried.

Aircraft safety is like religion in many ways. There is the quiet kind, the hell fire and damnation bit or the cloak and dagger type. It is a personal thing. A person may know all there is to know about aviation safety and still not practice it. He may know little, care less, and ignore aviation safety completely in his necessarily short life. His attitude toward aviation safety and his acceptance or rejection of it determines the part it plays in his life.

In Aircraft Ferry Squadron Thirty-One the safety program is rather quiet. Over the years it has been an education of the individual, almost

always experienced people, to conform to the rules when on their own, as they usually are in ferry work. LCDR Steve Kelly is the squadron Safety Officer. His weekly briefings at the all-pilots-meeting on Monday mornings are not a time of indifference for the pilots. His dry wit pops out of each of his safety reminders and his audience of pilots is always enraptured. Notes on these lectures are prepared and passed on to pilots who are on the road ferrying aircraft and who miss these meetings.

Our safety answer to the flying of a large number of different aircraft is a rigid, tough, and continuing training program. Original checkouts are thorough and extensive. Each pilot coming into the squadron is categorized into one of three basic areas—jet, multi-engine or helicopter. Within his framework of experience the neophyte ferry pilot can easily qualify in at least five different aircraft in his area, with a little work and initiative.

The very fact that all aircraft flown by the professional ferry pilot never belong to the ferry squadron makes him suspect of the material condition of the aircraft. The requirement that high time engines be installed on old aircraft to be ferried to storage makes the pilot alert to other units that might be off the "squadron hangar queen." Bureau of Weapons, however, backs up the ferry pilot, in that all essential systems must work before the aircraft is ready for issue (RFI). With these facts in mind, the ferry pilot, with his checklist in hand, makes a thorough check of the aircraft prior to "buying" and has a VFR test hop behind him before heading toward the boneyard with the old bird. Even new aircraft, with their various improved systems, catch the close scrutiny of the professional ferry pilots during preflight inspections. The ferry pilot is not a kick the tire, light the fire and go type—he checks before he buys.

One of the big problems—and it vitally concerns safety—is the extensive amount of gear the ferry pilot must carry with him. The author is qualified, among others, in the F-4 (F4H), F-8 (F8U) and F-9 (F9F) aircraft. Each takes a different type

oxygen mask and the three masks must be taken on every ferry trip. A checkout in the F-6 (F4D) has been considered, but another oxygen mask might burst the bag; considering the torso harness, the Mk-II and Mk-III life vests, parachutes for aircraft not having them in their inventory, other personal survival gear, a flashlight, high top shoes, a protective helmet, an anti-G suit, and checkoff-lists, already in this bag. Have you ever tried to find a place to put this much gear plus yours and your radar operator's suit bags in an F-4 (F4H) or a T-1A(T2J)? The temptation to leave out some of the gear arises, but the professional ferry pilot will never be caught without a full bag.

Normally a pilot in a Navy squadron, after a hop in his aircraft comes back to his field or ship to land. The ferry pilot, after a hop in *someone else's* aircraft, comes in to land at *someone else's* field. Every military field has an Operations Manual setting out traffic regulations, and this document is usually an inch or more thick. This is mentioned only to show that each field has its own peculiar rules. You may notice, however, a normal pilot planning a cross-country flight takes long hours gathering much of this information from planning documents as is necessary for his trip. To the professional ferry pilot much of this is known and he only updates his information while filing out on each leg of his hop. He learns this information from his normal progression through the stages of the development of the professional ferry pilot.

When a pilot is first assigned to Aircraft Ferry Squadron Thirty-One he studies, and then completes aircraft and NATOPS examinations on at least three aircraft he will ferry. Required reading, road briefing, and flight physiology requirements behind him, he then becomes a follow pilot as soon as he qualifies in these three aircraft. De-

pending on prior experience, he then makes from one to five round trips, East Coast to West Coast and back, and if his lead pilot on each hop gives him favorable reports and he has completed qualification in at least five aircraft, he is designated a single pilot. He may then become a lead pilot by having a minimum of 1000 hours total pilot time, completing three coast to coast round trips as a single pilot, passing a written examination, and being recommended by the Training and Operations Officers of the squadron. Of course all pilots must be instrument qualified.

Overseas ferry is done by experienced, squadron designated pilots. During 1962, our pilots delivered aircraft to Rota, Naples, Johannesburg, and Port Lyautey, as well as aircraft to Turkey, Guantanamo Bay and several other bases outside ConUS. Numerous other aircraft movements overseas, some directly to the ships, are controlled by the ferry squadron, but squadron pilots considered more qualified in type are used for this work.

How has VR(F)-31 done safety-wise with this program? During fiscal years 1962 and 1963 our accident rate was well below the overall Navy's. The squadron won a special CNO Safety Award for fiscal year 1962.

A quick look at the experience level of VR(F)-31's professional ferry pilots shows that as of 1 April 1963 with 46 pilots assigned, these pilots had flown a total of 180,568 hours. The average pilot had logged 3925 hours of total flight time.

So we conclude that the *two* factors that are most pertinent to a climate that safety can grow in, are experience and training. The catalyst that causes a safe operation to emerge is the personal religion of safety consciousness every mature pilot must possess to keep him and his unit on top of the safety statistic pile.

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Commander Billy "Buck" Carroll is a native of Chattanooga, Tennessee. He underwent flight training as a NavCad and received his commission and wings in August, 1943. During World War II he served with VF-84 aboard USS BUNKER HILL (CV-17) in the Pacific and later, as operations officer of VF-152 aboard USS PRINCETON (CV-37), he flew numerous missions over Korea.

Commander Carroll attended General Line School at Monterey, California and holds a B.A. degree from the University of Mississippi and a M.S. degree from Boston University.

In September, 1962, CDR Carroll reported to Aircraft Ferry Squadron THIRTY-ONE as commanding officer.

HOSTILE

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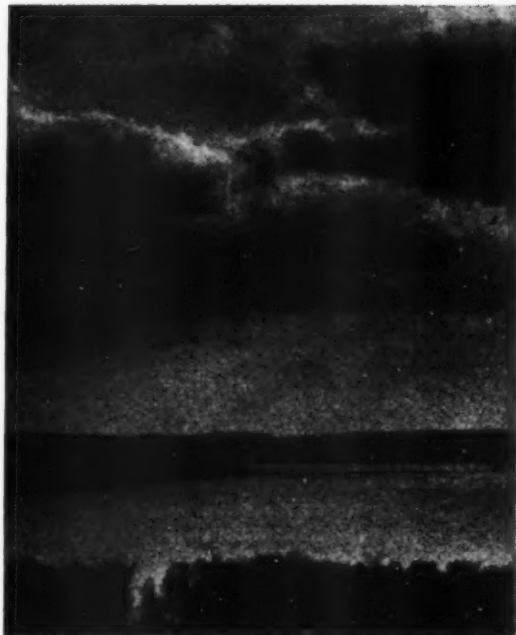
Neither lead pilot nor wingman in a night midair collision was wearing an anti-exposure suit because the flight was not over "open water." The survival problems they encountered after this accident point up the fact that a good cold river can be just as hostile as the North Atlantic . . . given a winter night . . . water temperature 44° F. . . . air temperature, 26° Cold facts, compounded with a near-fatal lack of survival equipment and survival equipment training . . .

First we will hear from the lead pilot, then as we turn the clock back to the collision, the wingman's story . . .

Lead Pilot: I received a tremendous jolt which dazed me for a second. The cockpit was illuminated with a bright white light which temporarily blinded me so that I could not read any of the instruments. The aircraft immediately went into a violent maneuver. I could see lights spinning and there were between 3 and 5 Gs on the aircraft. (*The pilot was not wearing an anti-G suit.*) An instinctive attempt to right the aircraft produced no response. At this time I elected to depart . . .

Due to the violent maneuvering, I made three attempts to reach the face curtain before I was successful. I could not properly position myself but I think I was close to the right position. At this time it felt as if the engine had exploded and torn off the aft portion of the plane.

I specifically remember being impressed by the smoothness and force of the RAPEC seat when I finally did pull the curtain. My left sierra fitting came loose during the ejection. At the top of the trajectory, I looked down and saw a small orange ball of flame which at the time I thought was the rocket seat. I do not recall seat separation but there was a definite jolt as the chute deployed and



two lesser jolts immediately thereafter. I retained my helmet which was to be invaluable in keeping my head warm during the cold survival period which was to follow.

Now my thoughts turned to attaching my survival gear to my torso harness with the lanyard. After releasing my lower left rocket jet fitting, I could not at first find the D ring on the seat pack. With great difficulty I located the lanyard and attached it to the left lower fitting on the torso harness. (*He should have attached it to the right*

ERIVER

lower fitting.) I then pulled down on a parachute riser and did a 360-degree turn to locate the closest land. I estimate I contacted water about 4 or 5 minutes after ejection.

On contact with the water I was slightly immersed, then came to the surface. I released the two shoulder rocket jet fittings with no difficulty. I then tried to release the right lower rocket jet fitting and had a hard time finding it. In my search I became slightly entangled in the parachute. I deployed my life vest but only one bladder inflated. (Evidently I didn't pull the other toggle hard enough.) I got free of the chute and finally located and released the right lower rocket jet fitting. Now I wanted to deploy the life raft. Due to the darkness and cold I had extreme difficulty locating the D-ring. Again and again I followed the lanyard to the seat pack but was unable to find the D-ring or the CO₂ toggle to inflate the raft. After about 15 minutes I observed helicopters beginning a search and at about the same time saw signals about a mile away which I thought must be my wingman's. (By now I had concluded it was a mid-air collision rather than single ship explosion.)

As I saw the helicopters I searched for the signal flares in my life preserver but I didn't find any.* Meanwhile I drifted back into the chute again. Once more I freed myself and began trying—still unsuccessfully—to deploy the raft. My hands had become numb and other parts of my body were extremely cold. I had been in the water about half an hour. I felt if I didn't deploy the

raft soon I would lose consciousness and drown.

Continuing my efforts to deploy the raft, I finally found the D-ring and toggle. The raft inflated and I climbed in, exhausted. After I got aboard I tried to pull the rest of my survival gear in with me and was dumped into the water again as the raft overturned. As I climbed aboard a second time, I realized that the raft had deployed inverted the first time. Now it was right side up. I had now been in the water about 35 to 40 minutes.

After resting for a few minutes, I splashed as much water out of the raft as possible and pulled the survival gear aboard on top of me, thinking perhaps it would provide some warmth. Then I tried to get the survival pack out of the seat pan to find a signal flare to attract the helicopter. I was partially numb all over and my hands had become so useless that I could not get the pack out. I felt I would not be found unless I could give some kind of signal. Three times helicopters and fixed wing aircraft passed within 100 to 200 feet of me without seeing me. In my summer flight suit the cold was almost disabling at this time. It was ironic that I had not worn an anti-exposure suit because the flight had not been planned over water.

I thought of using my survival knife to cut my way into the pack but decided against it since I did not have full use of my hands and was afraid I would cut the raft. I continued my efforts at the survival pack but because of the darkness and cold was unable to get it out for about an hour after entering the raft.

Even when I got the pack open I was no better off. I could not distinguish the flares from other gear because of the darkness and lack of feeling

*The squadron's life preservers were due for a 90-day inspection. Their usual procedure was to equip spare life preservers with extra survival equipment for use during the two-day inspection period. However, there was a shortage of flares and therefore these two pilots' life preservers did not have them.



I could see a white light approaching from about the 1145 position, slightly high.

in my hands. My arms were now numb to the elbows. I tried to identify the flares for about 15 to 20 minutes but without success. By now my hands were completely useless and my body was quivering and shaking so much from the cold that I decided further efforts would be useless. I decided to paddle to a bright light which I saw about 1 to 1½ miles away. I had been on my way about 10 minutes when a helicopter appeared and the pilot saw me. The helo hovered over me and lowered the horse collar. I was hoisted aboard and laid in a stretcher. I inquired as to the safety

of my wingman and received a thumbs-up . . . I had been in the water 50 minutes and in the raft an hour and 15 minutes.

* * *

Now back to the midair collision again for the wingman's survival narrative . . .

* * *

Wingman: I could see a white light approaching from about the 1145 position, slightly high. I pushed forward on the stick to go low. We hit . . . I was thrown violently to one side of the cockpit. I tried to control the aircraft but nothing



out the ion, slightly high. I pushed forward on the stick to go low.

... I happened. It seemed to go around about three times before I was finally able to eject. First, I tried for the face curtain but I couldn't get it; then I attempted unsuccessfully to reach the alternate firing handle; finally, I grabbed the face curtain, straightened my back and pulled.

Although the ejection was rather mild, I felt completely disoriented. When the chute opened, there was another shock and some time during this period I was smacked under my jaw by the butt of my pistol. The shoulder holster had enough give to allow the pistol to swing up. I

didn't pull the D-ring on my parachute because the chute opened normally and actually it didn't occur to me at the time to do so.

The trip down seemed to take a long time. I started checking my gear to see what I had. My helmet and mask were askew—the mask seemed to be over my eyes. I pushed my helmet down on my head and discarded my mask. I then disconnected my lower right rocket jet fitting and thinking about my raft, I grabbed the seat pan and pulled it into my lap. (*Recommended procedure is to disconnect the lower left rocket jet fitting thus*

permitting the seat pan to swing around to the right side. Then the raft lanyard is easily accessible and can be attached to the lower right rocket jet fitting.) I found the D-ring on the seat pack and pulled it. It came right out but no matter how hard I hunted around I couldn't find the yellow lanyard.

About this time the water appeared quite rapidly and I took a deep breath. I went under and it seemed as if I surfaced immediately. The water was calm and very cold. I was wearing an anti-exposure suit liner under my summer flight suit but it was no help after it got wet.

I pulled my life preserver toggles. For a few seconds I panicked; then everything settled down. I grabbed my seat pack which was floating next to me and tried to find the lanyard for what seemed like 15 to 20 minutes but with no success. Meanwhile, my legs had become tangled in the chute. I was afraid I was going to be trapped so I decided to let the seat pack go and work on something else. My flares, dye marker, etc. went with the seat pack. When I had released all the fittings, everything started to sink; I kicked my feet and after a while they came free.

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Next I decided to get my .38 caliber out of the holster. I had not had time to draw my own pistol from the squadron armory and the borrowed pistol I had did not have a lanyard attached. After pulling and tugging on the retaining strap, I finally got it free. I fired one round of tracers to make sure the weapon was functioning—the round went up and illuminated the sky.

By now my hands were pretty useless because they were so cold; I banged them together to try to get some feeling into them. An aircraft appeared and I fired off tracers to get the pilot's attention. He orbited my position for quite a while. I fired off a round of tracers every few minutes so that he would not lose me. Then I started thinking about my flashlight in my survival vest. I couldn't open the zippers with my summer flight gloves on so I took off my right glove and tried to get at my survival knife or my switchblade knife. Although my switchblade knife was in my left arm pocket, I couldn't get it. Finally I was able to get my survival knife which was attached to my torso harness at the chest.*

Meanwhile a chopper flew right near me and I

*As a result of this case a revision is being made to the A4B/C NATOPS manual to state that the sheath knife should be carried in a special canvas pocket sewn to the torso harness in such a manner that the chest strap passes through the sheath.



tried to fire my pistol, but by now my hands were so cold I had to unload and reload with my teeth. This took a long time. I was able to fire two more rounds, but I don't know if they were observed. I really had a problem with all my gear—bullets in my mouth, survival knife clamped between my teeth and pistol in my rather useless hands. My hands were so cold that I dropped the pistol when I tried to put it back in the holster. As it sank it hit my body—I almost had it with my feet but it got away.

With no pistol I decided I *had* to get my one-cell flashlight out. I couldn't unzip the zipper so I cut my survival vest open and pried the flashlight out. This took me quite a while. *(It was later discovered he had cut into the upper bladder of his life preserver in this attempt. The lower bladder was intact and provided enough buoyancy to keep him afloat.)* As I got the light on I could hear a chopper so I raised my right arm as high as I could and waved the light.

I didn't have any trouble getting into the rescue sling and they pulled me right up. *(Rescue personnel, however, reported that both the pilot and wingman were slow getting into the sling.)*

From here on I don't remember much except that someone tried to cover me up. I asked how soon we would land. He said "Right now." I had been in the water about an hour and a quarter. *(This time is within the range in which 50% of unprotected subjects become unconscious. The pilot later stated that because he had been immersed in extremely cold water for an hour at E&E School, he knew he could take it. Investigators felt the pilot's will to survive and the knowledge that he could survive were decisive factors here.—AAR)*

The wingman's knuckles were cut and swollen where he had beaten his hands together to warm them. He was so cold he was blue and he was shivering from extreme exposure. After a hot shower and a hour on heating pads, his 97° temperature went up to normal. He was returned to a flying status after three days.

The rescue of these two downed pilots was anything but routine. In the first place, the air station crash boats were not in running order and still another crash boat broke down after being launched. In addition, the primary crash circuit was never activated. More than anything else, the investigating flight surgeon stated, the rescue was successful because the right people happened to be at the right places at the right time. Two efficient SAR crews, some alert military police and

some observant pilots working with only a fair communications network effected the rescue.

The pilot of the helicopter making the first pick-up observed the wingman's tracers over the water, a sighting verified by an orbiting F8A (F8U-1). Haze prevented accurate estimate of the distance. After an unfruitful search of the area, he saw two more tracers directly ahead of him. After flying two squares, he saw a faint white light and simultaneously a T-28 pilot sighted an object in the water. The helo commenced a descent, lowered the sling and hovered over the survivor. Getting the wingman under the hoist was complicated by the incoming tide and the haze. He was picked up and flown directly to the hospital.

In the case of the lead pilot's rescue, rescue personnel had figured that since the tide was coming in there would be a good chance that he might have drifted toward the shoreline. Area personnel were requested to send out search teams to patrol the shoreline. About an hour later a military police truck spotted a "blinking light," (most likely the reflective tape on the lead pilot's helmet) and shined his headlights in that direction. A searching helicopter was notified and returned to the shore to line up on the truck lights. Approximately ¼ mile out, with his spotlight the helo crewman located a pilot in a raft. He was hoisted aboard only after the crewmen cut his raft lanyard and the raft dropped back into the water.

One of the rescue helo pilots sums up our story nicely: "It is hoped that this account of a night helicopter rescue will serve as a reminder to all of us of the importance of personal survival equipment, its use and its value . . ."

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Human Nature

All pilots of this squadron are aware of the survival equipment which they are required to carry on each flight. Since having this equipment when it is needed could very well mean the difference between life and death to an individual, it would seem that a program of close supervision and inspection would not be necessary to ensure that each pilot does, in fact, carry the required equipment. However, since human nature is as it is, a program which will produce the supervision and inspection necessary to ensure that the proper equipment is carried has been established in this squadron. . .

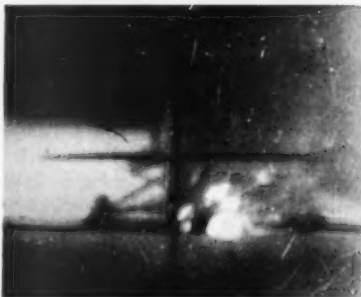
—1ST ENDOSER TO AAR



Miraculous Journey

Once in a while an ejection takes place which, though it doesn't illustrate or illuminate a particular problem, is so amazing it warrants publication of itself. Here's one the reporting flight surgeon describes as a "miraculous journey."

In a night carrier landing an F-8C(F8U-2) struck the round down just forward of the main gear mounts. The gear was sheared off in an explosive flash and the aircraft, sliding on its fuselage in a right wing down position, continued up the angle deck and disappeared over the forward edge. At this instant an observer heard the ejection seat fire and saw the pilot ejected from the cockpit. From this position (30' to 40' forward and 10' to 15' below flight level which is 50') the pilot, in his seat, was ejected onto the forward part of the axial deck where, still in his seat, he collided with an F-8C (F8U-2) which had just been parked after landing. The *Crusader* canopy was shattered but the pilot was uninjured. The approximate position of impact was over the port catapult track



about 50' aft of the forward deck edge.

Forward momentum after seat separation carried the pilot over the parked aircraft and onto the flight deck. After the initial collision the pilot was thrown to the deck and came to rest at a point at mid-ships forward of the No. 1 elevator. The seat fell to the deck where it struck an airman, injuring his right leg slightly.

The pilot's parachute deployed some time after separating from the seat and was quickly sucked into the air intake of the *Crusader* with ingestion of the chute. The pilot was dragged up underneath the intake where his shoulders were impinging against the underside. At this point he was found, cut from the parachute risers and, "slightly confused but reasonably coherent," was carried on a stretcher to sick bay.

The pilot doesn't remember events from pulling the curtain until he was being "cut out of my clothes alive on the flight deck." His injuries were a broken hip and minor abrasions.

notes from your flight surgeon

No Suits

None of the survivors of a helicopter accident thought to take the anti-exposure suits from the aircraft although this would have delayed exit by 3 seconds at the most. When asked if he would have thought to take the suits even if rescue had not seemed so imminent, each man answered, "probably not." Water temperature was 58°, air temperature 63°.

Flight surgeon's recommendation: That it be stressed in ditching drills that if there is no time to don the anti-exposure suits before ditching, the suits should be taken along to be put on after boarding the rafts.

NASC Comment: An outer cover as offered by the anti-exposure suit gives some protection even if the wearer enters it soaking wet.

Raft Inflation

After entering the water and inflating his life vest, a helicopter pilot unstrapped his PR-2 pararaft from around his waist because he couldn't find the lanyard to inflate it. He held the raft in front of him in the water and pulled the toggle. Three hard pulls were required to break the safety wire, open the valve and inflate the raft. Later he stated he would probably have given up had he not recently investigated a case in which difficulty with the raft inflation valve was involved.

The raft actuating device is normally held closed by spring action and friction plus a lockwire and seal. A short lanyard is provided for opening the valve. Inflating the pararaft requires a hard pull on the lanyard and the valve must be opened completely for the raft to inflate properly.

Mess Line Casualty

An H-34(HUS) was being spotted on the carrier hangar deck near a mess line on the port side. The men in the line had been cautioned to get out of the way while the aircraft was being moved. Running in a moderate sea, the ship rolled to port. The aircraft picked up momentum and rolled toward the mess line. Everyone moved except a PFC. A buddy tried to pull him out of the way but was shrugged off. The aircraft rolled over the PFC's foot, breaking both his foot and ankle.

Souvenirs

Personnel arriving at the scene of the accident within minutes after the crash removed the face curtain and secondary ejection handle from their respective positions on the ejection seat, then took these objects to their barracks, apparently for souvenirs. This act alone almost led the accident board completely astray, incriminating the pilot . . . Some means should be found to emphasize to all personnel aboard an air station the importance of remaining clear of all aircraft wreckage and never to touch anything or pick anything up.—*From an MOR*

(How about station safety officers seeing that articles appear on this subject in station newspapers?—Ed.)

Unwise Precaution

An aircraft crashed into a river in approximately 1½ feet of water. Because the pilot was near the bank and the water was shallow, he took off his shoes and waded ashore barefooted. His idea was to keep his shoes dry and prevent problems that might ensue on a forced march in wet shoes. Though the water was rea-

sonably clear, the river bottom and shore were rocky in spots and sharp objects could have been concealed by the mud. If anything had cut the pilot's bare feet badly, his dry shoes would have done little good—he would never have been able to make an extended hike for assistance. Moreover, even a relatively minor injury in a survival situation can lead to aggravated difficulties when medical aid is not available.

Slippery Deck

After a hard landing aboard ship, the plane caught fire and burned fiercely. The pilot jumped to the starboard wing and then to the deck. His feet went out from under him on the wet deck and he fell backwards striking the back of his head. His helmet absorbed the force and he was uninjured.

Plane Director Injured

After the final recovery at 2400 the white lights were put out in the hangar bays aboard the carrier and the respot began. An hour and a half later the last aircraft was being maneuvered into final spot for the night. A plane director was attempting to direct the movement of the aircraft and handle the tow bar simultaneously. As the aircraft was steered into spot, the tow bar passed close along the starboard side of another aircraft. The plane director failed to observe one of the stationary aircraft's chain tiedowns trailing from the after tiedown point. The moving aircraft pinned his right hand and upper right thigh between the towbar and chain tiedown. He was hospitalized 21 days with a lacerated hand. ●

NDT

Radiography — or Lookin' Without Bustin' — a Boon to Aircraft Maintenance and Accident Prevention

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Non-Destructive Testing normally means all methods of non-destructive testing. There are many including: Liquid penetrant, magnetic particle, film radiography, xeroradiography, TV X-ray image, contact ultrasonic, immersion ultrasonic, electrified particle, filtered particle, magnetic field, eddy current, strain sensitive and thermal, to name some, and there are more methods to come.

All have different capabilities and limitations. Most of us are acquainted with the more familiar methods such as dye penetrants, magnaflux. These methods usually require removal, disassembly, stripping of paint on the suspect part before inspection can be accomplished. Workload is increased to thousands of man-hours in some cases. What was sorely needed was some type of lookin'-without-bustin' method. Realizing this, BuWeps made a study of the problem. Here are the developments:

Early in 1959, the Bureau of Aeronautics initiated a project to the Naval Air Station, Jacksonville to make a study of the attributes of portable X-ray as an aircraft maintenance tool.

The study revealed that considerable savings could be made and the reliability of the aircraft could more adequately be determined through the use of portable X-ray. This inspection medium provides a means for checking integrity of aircraft structures without the need for major disassembly.

It was determined that X-ray equipment should

be provided to activities ashore performing Class "B" and "C" levels of maintenance and shipboard activities performing Class "D" level of maintenance. An initial quantity of 102 portable 140-KVP X-ray units has been procured (see photo next page). These units are in process of being delivered to activities having a qualified Aircraft Radiographer.

What Can Be Done

The prime purpose of portable X-ray is to locate defects or flaws in aircraft structure with little or no disassembly. Most generally the flaws will be cracks due to fatigue, stress corrosion or overloads. X-rays will penetrate most of the aircraft metals and when used with X-ray film will produce a shadow picture of the structure of assemblies beneath the surface. With this in mind there immediately arises a number of other possible applications for portable radiography:

Inspection of Parts Through the Packaging Materials. Many items are received in complex airtight, waterproof packing. One simple electronic assembly was suspected of having a solder joint pulled apart. X-ray was accomplished through the packaging materials, the acceptable items were stocked and the rejected items returned without removal from the package.

Inspection of Sealed Tubing for Corrosion or Tool Marks. X-ray will reveal pit corrosion on the inner diameter of aluminum and steel tubing.

Identification of Alloy Content. During replace-

PORTABILITY PLUS—Radiographer Chief Structural Mechanic D. M. Lansford demonstrates dolly for Sperry Portable X-ray Unit 140 KVP built by Oceana AMD from salvaged materials. Specifications: Boom extension 3' to 9'; Boom swivel 360° from horizontal to vertical; Tube head holder swivels 360°; Tube head holder rotation 360°; Brackets permit dolly elevation by forklift; Lead plate for exposing small parts. Unit on stand is Radiac Meter AN/PDR-27 approved for surveying radiation.



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ment of jet engine compressor blades, the old blades and newer type were mixed. The only difference was alloy content. All blades were X-rayed and the new blades sorted out as they were more dense to X-rays than the old blades.

Detection of Water in Honeycomb Surfaces. Honeycomb surfaces collect water beneath the skin. X-rays readily reveal the water collection.

Detection of Machining Flaws. A silver-soldered shaft on the HTL helicopter was found to have machining flaws. When drilling the shaft the drill had progressed beyond the limit on certain shafts.

X-raying and measuring the clearance sorted out the defective shafts. This method also detected nicked and damaged spars on HUP aircraft.

Distortion of Shear Pins. Proper alignment of film and X-ray machine clearly located partially sheared pins in control rod assembly.

Shock-Strut Cylinder Nut. Shock-strut cylinder nuts were inspected while assembled in landing gear to detect discrepancies in clearance. This inspection formerly required complete disassembly of the landing gear.

Wing Flap Hinge Bracket. Detection of tool

marks on the wing flap hinge bracket without removal from the aircraft. Four bolts had to be removed to permit insertion of the X-ray tubehead.

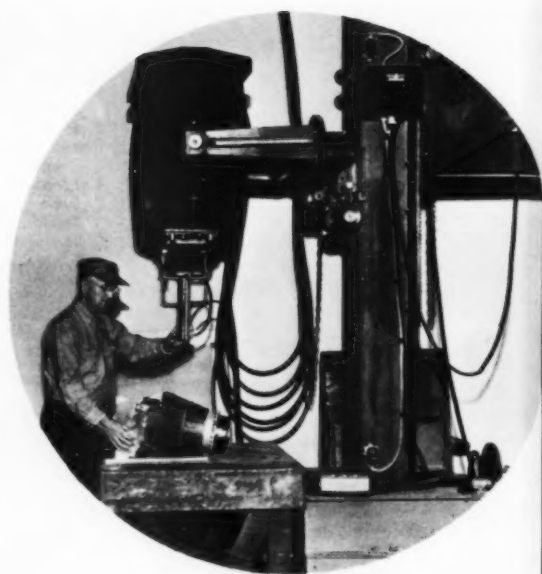
Propeller Heating Boots. X-ray of propeller heating boots to check condition of the resistance heating wire. There are just some examples of the many possible uses of portable radiography.

Who Can Do It

Due to the nature of X-ray, it was determined that extensive training would be required. So, a training course was set up at the Naval Air Technical Training Unit, Naval Air Station, Jacksonville.

The school trains Chief, First Class (and selected Second Class) Aviation Structural Mechanics in the theory and skills of applying X-ray principles to aircraft maintenance. Marine Corps and Civil Service personnel are also eligible to attend the school.

To date, over 100 people have been trained and are considered to be qualified Aircraft Radiographers. It is anticipated that a short course will be established in the near future to provide Aircraft Maintenance Officers with a knowledge of the capabilities of X-ray and X-ray film interpretation.



NON-PORTABLE X-RAY used in O&R has proven value of inspection. Portable units add new dimension to radiography in aircraft maintenance.

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SPERRY X-RAY CONTROL UNIT is explained to students by instructor O. R. Daughenbaugh, AMCS, right. Remote controls set up outside the work room, enables the radiographer to operate the unit without exposure to radiation.

How it Operates

Radiography operates on the same principles doctors employ in X-raying the human body. Radiation is projected through the item to be checked and the result is captured on film, which is then developed much like a photographer processes film from his camera.

The use of radiography in the Armed Forces is comparatively new, but commercial airlines have practiced it for several years.

Since the X-ray technique can seek out internal cracks and defects in metal parts the human eye might miss, greater safety for fliers results from use of radiography, in addition to the monetary savings.

Scope of Training

Areas of instruction within the course cover a wide range. The first week starts off with school indoctrination, delves into basic mathematics and touches on non-destructive testing, radiation theory and the radiographic process.

In week two, the student starts learning about radiographic film, darkroom procedures and radiographic equipment. From there, he moves on, during the third week, into the personal safety aspects of radiography, studying protective equipment and regulations governing permissible radia-

tion dosage. The third week also marks the beginning of studying some of the advanced areas, such as determining exposure time for multi-thickness objects and use of X-ray exposure charts.

Further study of radiation and laboratory experiments split the time almost equally in week four and the fifth week is taken up in additional laboratory experiments and study of the application of radiographic principles as applied to aircraft maintenance.

The sixth, seventh and eighth weeks are devoted exclusively to laboratory experiments and practical work on aircraft.

The school also teaches gamma radiography. This process involves the use of radioactive isotope, such as cobalt, radium or iridium. According to LT Joseph S. Bouchard, Radiography School Training Officer, the school has the equipment to handle isotopes, but does not have the isotopes themselves, since a license is required from the Atomic Energy Commission. When a license is obtained, iridium 192 will be used.

CONTROL ROD TERMINALS to be exposed to radiation to make a radiographic film. These parts have been removed from the aircraft, but many of the parts checked are never removed from the aircraft. A portable unit is wheeled up and the film is made on the spot.



Radiation Hazards

Safety is emphasized in using radiographic equipment, too. Each individual whose duties require him to be in the vicinity of the sources of radiation used in the school wear three safety devices which measure exposure to radiation—a dosimeter which is read and recorded daily, a pocket chamber (a type of ionization chamber) read weekly and a film badge read by an industrial hygienist at NAS Jacksonville's Overhaul and Repair Department once a month.

"Working with radiation, we have to emphasize personal safety," says Senior Chief Aviation Structural Mechanic Joseph S. Kordek, supervisor of the school. "If a man is accidentally being exposed to radiation, there is no sensation. Radiation safety is emphasized throughout the course and we use personnel safety devices (the dosimeter, pocket chamber and film badge) to measure the amount of radiation a man is exposed to. A weekly radiation dosage limit is set and if the individual reaches this limit, he is kept away from radiation for the rest of the week."

Work rooms are lead-lined to a height of about 7 feet to shield against escaping radiation, and plans are being made to extend the shield to cover the entire rooms. A survey meter, which measures radiation much like a Geiger counter except that it employs a calibrated dial instead of a ticking sound, is used as a safeguard against excessive radiation.

"There is no possible danger of anything in the area being contaminated," Chief Kordek emphasizes. "The type radiation we use is emitted only while the unit is operating and there is no residual radiation. The only danger involved is direct exposure. Every precaution, in the form of the safety devices described and personal care is taken to avoid that."

Qualifying Operators

The eight-week classes are presently carrying about 20 people, including a few Marines and Civil Service personnel. Classes run heel and toe.

The Navy will eventually have qualified radiographers at every naval air station. Students are presently coming from naval activities all over the world, including aircraft carriers, to attend the school.

Carriers can only use radiographic equipment while in port, because the equipment in operation interferes with radar and Combat Information Center equipment.

Quotas for enrollment are now assigned by the

Naval Air Technical Training Unit. They were formerly a function of the Bureau of Weapons, but control was handed over to NATTU effective with the July 1963 class.

The school, at present levels, will graduate only about 120 students per year. With proper management support, properly motivated and trained radiographers, the Navy will reap a savings of thousands of dollars, not to mention the intangible—flight safety.

For detailed information concerning procurement and distribution of X-ray apparatus and related components see BuWeps Inst. 13850.1. Write NASC for Radioactivity Warning Poster C5-GS-1262.—Ed.

MAGNAFLUX method of inspection requires disassembly and cleaning of parts.



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Castings vs Forgings

TERMINOLOGY again — this time the two words “casting and forging,” and why you shouldn’t mix them up.

There is, and always has been, a tendency on the part of both military people and company representatives to refer to any big, beefy, complicated-looking piece of aircraft structure as a “casting.” Castings, however, are not used in the primary structure of modern aircraft, and not used very often in the secondary structure either. Those big, structural pieces are forgings. Castings are used for such things as handles and small, lightly loaded pieces of secondary and tertiary structure.

What difference does it make what you call an item, as long as you identify it clearly? None at all, if it were only a matter of word choice. However, *thinking* of a major structural item as a “casting” can lead into some wrong alleys when it comes to failure analysis. For example, some recent trouble reports concerning such items as main gear trunnion support fittings spoke of the possibility of failure caused by “flaws,” even “bubbles,” in the “casting.” Now, such things as bubbles are properties of a defective casting, but not of a forging. That is why forgings rather than castings are used exclusively in the major structure.

Without going into a treatise on metallurgy, let’s discuss the major differences between these two types of metal fabrication. All metal stock, of course, is cast originally as it comes out of the smelter. To make billets for forging, it is then rolled, which com-

pacts the grain of the metal to a uniform consistency, largely eliminating flaws and inclusions which tend to weaken the billet. As the billet is forged it is impacted (hammered) into shape which further improves the consistency of the metal.

A casting, on the other hand, can’t be rolled or hammered to remove inconsistencies in the grain structure. These are held to a minimum, of course, by various controls, and excessively flawed units are rejected by X-ray inspection and other techniques. However, by the very nature of the manufacturing process, a casting is inherently weaker than a forging of equal size. In fact, a casting would have to be designed about twice as heavy as a forging to meet a given strength requirement. In addition, castings tend to be more brittle. In the language of the stress engineer, they are “notch-sensitive”; that is, they are more apt to crack at sharp corners and shoulders than a forging of the same design.

Of course, forgings are not perfectly consistent either; there can be hairline inclusions and other defects, but these flaws are not nearly as important as they are in a casting; as a cause of structural failure they are almost negligible.

Therefore, in considering the reason for cracks in major structure, it is more useful to look for the causes of failure to which forgings are susceptible, such as brute overstress, stress corrosion, or fatigue, rather than for material defects, such as porosity and bubbles, which are peculiar to castings.

—McDonnell Service Digest

NOTES AND COMMENTS ON MAINTENANCE

Care of Hydraulic Systems

BECAUSE of the extremely close tolerances of hydraulic pumps, valves and actuators, the cleanliness of hydraulic fluid must be carefully controlled to prevent damage to the components of the system. The best assurances for maintaining clean hydraulic fluid are clean maintenance habits, special care in servicing the system, proper handling and storage of parts and flushing of hydraulic systems when required.

The two basic types of contamination that plague hydraulic systems are chemical and foreign particle contamination. Chemical contamination usually consists of water, fuel, grease and oil. Foreign particle contamination usually consists of dirt, lint, sand and metal particles. Ideally, there should be no foreign particle contamination in hydraulic fluid systems, but, because of the nature of metal components, this ultimate is difficult to achieve. Filter screens, which are inspected at regular intervals for damage and contamination, aid in the removal of foreign particles.

After the emergency air brake system has been used, or any time a system shows signs of containing air, it is advisable to bleed affected systems. (For bleeding hydraulic systems refer to the applicable Maintenance Manual.)

—Delta Air Lines Technical Review

Jumping at Conclusions

AN F-8B (F8U-1E) was put out of commission for a low EPR reading. Maintenance crews removed the tail section and proceeded to the burner ramp (high power turn-up area) with the aircraft for a trim run. On turn-up while at high power settings smoke was noticed in the cockpit. The crew leader, after inspecting for the reason for the smoke, suspected a possible refrigeration turbine failure. The aircraft was returned to the line and the discrepancies reported to the safety/survival shop for corrective action.

The safety/survival shop, in trouble-shooting, found the turbine lubricating system overserviced and stopped looking for a malfunction knowing this could

cause smoke in the cockpit on turn up.

At this point the night crew took over maintenance. The night check crew took the aircraft back to the burner ramp for another turn-up (trim run). On turn-up smoke was again noticed in the cockpit. The crew leader called the night crew chief and told him what the prior problem had been. It was decided to continue the trim run.

Outside air temperature was approximately 45° F. The trim run was continued and no time during the run did the man in the cockpit report any excess temperatures. After several minutes (ten minutes stabilization run and five minutes trimming) an electrical power failure occurred. The turn-up was secured at this time.

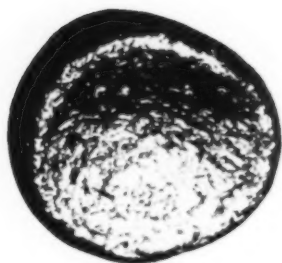
It was determined the initial cause of trouble was a failed refrigeration turbine. The aircraft continuing to run caused secondary damage to the air conditioning and pressurization system control valves and plumbing. The excess heat also warped the canopy insert and the side wind screens which required replacement as the corrective action. Some 90 man-hours were involved in repairing damage caused by excess heat. Reason for the incident—improper trouble shooting. The trouble shooter took it for granted that the overserviced turbine was the only reason for smoke in the cockpit. Take nothing for granted—proper troubleshooting to the depth required to ascertain the real reason for a malfunction will pay dividends in preventing such occurrences.

—Anymouse

Quality Control Threat

A TREND which may possibly affect the aviation safety program was considered to be the retirement of many senior and well-qualified aircraft maintenance officers and staff non-commissioned officers. It is felt that the Quality Control Program may be affected, especially during the next six to eighteen months, which will witness a high retirement schedule. It was suggested that the G-1 of the member commands investigate the situation from a manning level standpoint, also find out if school quotas can be based on T/O instead of M/L.

—3rd MAW



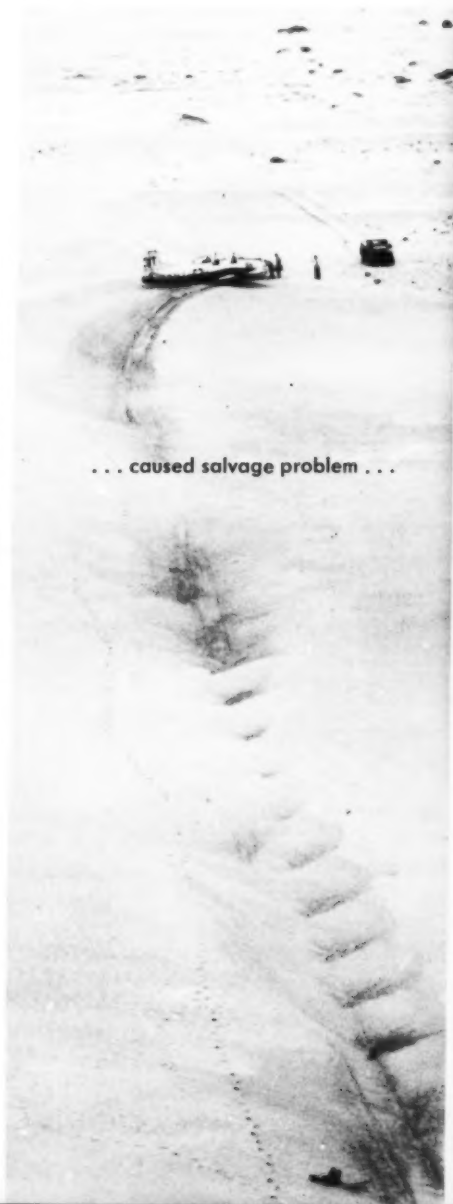
Valve failure caused piston failure caused engine failure . . .

Short Short Story

. . . caused forced landing . . .



. . . caused salvage problem . . .



. . . caused Army-Navy solution.



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F-4B Test Hazards Sparrow III

COMPLEXITY of the high-performance F-4B (F4H-1) and associated equipment containing numerous power-actuated devices, high-voltage electrical circuits, latest AMCs and missile launching concepts . . . presents a significant potential hazard to ground test/maintenance personnel. Proper and safe operational procedures for specific system ground handling hazards are contained in the maintenance and servicing handbooks, for the F-4B (F4H-1) and the Sparrow III missile. It is imperative that strict compliance with prescribed safety procedures be observed. It is notable that no significant casualties have occurred during the preparation and maintenance of the F-4B (F4H-1) aircraft for about 150 flights extending over a period of 18 months. The most predominant hazard is the numerous personnel collision obstacles (i.e., engine breather doors, flags, gear/doors), on the underside of the aircraft.

On the basis of monitoring of F-4B (F4H-1) fleet activities, it is noted that due to the current excessive maintenance requirements, flight schedule commitments, space congestion, personnel training, and other factors imposed by activity or environment, that probable accidental injury is more prevalent under such conditions. In particular, simultaneous maintenance by separate ship crews on the same aircraft requires stringent crew coordination to avoid equipment and personnel injury. The following are some typical potential personnel hazards associated with testing/maintenance of the AMCs and related areas.

Operation of the AN/ABH-8 missile control test set involves the use of dangerously high voltages. Replacement of tubes or performance or adjustments for test sets provided by the AMM-8 with voltage supply ON is hazardous. Under certain conditions, dangerous potentials may exist in circuits with power controls in the OFF positions due to charges retained by capacitors, etc. If circuits are not discharged or grounded, prior to equipment maintenance, serious injury can result.

Alignment procedure for the APQ-72 indicates removal replacement of fuzes F4603 and F4604 to test circuit function. It is noted that voltages at F4603 and F4604, located in the servo plate, are dangerous when power switch is in STBY or OPR positions. Care must be exercised inasmuch as the procedure indicates the check is performed in STBY setting.

Because of arcing and possible explosion hazard during testing of the APQ-72 modulator inverse

diode overload for proper function of the circuit, it is necessary to confine the check to a bench insulation.

Lethal voltages are present in the modulator; also, arcing will occur when the pulse is changed. Therefore, it is imperative that extreme caution be exercised when working on the modulator because of the possibility of direct personal injury and the potential explosion hazard if the cover is removed.

High voltage is present at the "B bias," "A bias," "B focus" and "A focus" controls. An insulated screw driver must be used, and extreme caution must be exercised when effecting maintenance.

The AMCs antenna employs a hydraulic drive system and can exert considerable force. Therefore, extreme caution must be exercised by fire control system technicians when working in the vicinity of the antenna when hydraulic power is applied. Further, inasmuch as the entire aircraft utility hydraulic system is pressurized during AMCs tests and maintenance, there is also the probability that actuation of flaps, wingfold, arresting hook, landing gear, etc., could inadvertently occur resulting in personal injury.

During maintenance of wing and fin, a cavity door, rigging, or component replacement located on stations 5 and 6, caution must be exercised to prevent injury to hands because of the threat of the doors actuating closed when electrical/hydraulic power is applied.

To prevent personnel injury due to physical strain imposed by the awkward lifting position beneath the aircraft, an excessively large crew is required to manually hoist the missile, using the AERO 64A bars to the fuselage stations.

The underside of the aircraft presents numerous door/panel and control surface collision hazards. The rapid fatigue encountered in sustained manual missile loading not only jeopardizes personnel, but is also detrimental to operational reliability due to reduced crew efficiency. Manual loading of the wing stations presents no unusual problems.

No specific workstands have been provided to facilitate maintenance on the upper portion of the AMCs package, in the extended position. Fire control technicians stand upon chairs, ladders, boxes, and even special support equipment to reach the radar equipment. These random methods are considered a potential hazard. A workstand other than

a ladder is required because exchange of the heavier pallets requires substantial footing. Inasmuch as a height of only 18 to 24 inches is required, a light-weight aluminum stand could be incorporated as part of the AMM-8 assembly. The stand legs should be foldable for minimum storage area, and the top should provide an insulated non-skid surface.

The 3000 psi nitrogen bottle located in the LAU-7A Sidewinder missile launcher presents a potential danger source. Inadvertent release of the 3000 psi charge during installation/removal/test of the bottle can be severely hazardous to servicing personnel because of the minute (.015) stream of air.—*Ground Explosive Safety*

Assumption

AS A quality control inspector, I was involved in the airframes inspection of BuNo on which an intermediate inspection was performed just prior to an accident which involved a wheels-up landing. This was caused by a piece of foreign matter that came from the replacing of a hydraulic flexline on the up side of the starboard main landing gear actuating cylinder. To my knowledge an operational drop-check was not performed in accordance with Airframes CAMI that was taken from BuWeps Inst. 13440.1.

"As a quality control inspector I was not called upon to inspect this line after it had been installed. But the fact that the line had been replaced came to my attention during my inspection because I noticed signs of hydraulic fluid around the area of the main strut and the landing gear doors. I asked one of the airframes men where the fluid came from and he said it was excess fluid that had come from the changing of the lines, at this time I went into the

Inflight Landing Gear Malfunctions

Good operating procedure dictates writing up landing gear malfunctions on the yellow sheet, even if the malfunction is subsequently corrected in flight. Whenever a nose gear or main gear fails to lower normally, but is subsequently lowered to a down-and-locked position by recycling, common sense dictates leaving the gear down and landing. Such malfunctions should be "downing" gripes until Maintenance thoroughly checks the system.

wheel well and took a look at the line and it appeared to be a good installation of a factory manufactured line.

"Assuming that this line had been operationally checked out after it was installed I went on about my inspection and it never came to my attention again until the check sheet was turned into me in the Quality Control Office and I noticed that it was entered in the appropriate place on the check sheet and signed off as being replaced."

The foregoing is a statement of an experienced quality control inspector taken from a recent AAR.

Handbook of Inspection Requirements states: Good maintenance practice dictates that aircraft coming out of scheduled or non-scheduled maintenance have operational tests performed on the affected equipments and/or systems to ensure proper functions, prior to returning the aircraft to an UP status.

Assumption by this quality control inspector cost us \$172,965. The quality control concept is fundamentally the prevention of malfunctions through discovery of maintenance errors. This concept embraces all events from the start of the maintenance operation to its completion. Achievement of quality control depends on inspection and knowledge. Remember the word *assume* has no place in the quality control system.

Crunch!

CHECK CREW discovered a fuel leak in the wing incidence of an F-8E (F8U) and in an effort to determine where the fuel was coming from, raised the wing. After looking for and not finding a jury strut available, the check crew used a wheel chock to retain the wing in the up position.

After finding the leak they decided to go to chow and return immediately and fix the leak. While at chow the plane captain took a GTC and went down the line lowering the wings. When the plane captain had lowered the wings on this aircraft he discovered the wheel chock lodged in between the wing and the fuselage.

An endorsement to this mishap read as follows: "The cause of this accident can be placed directly on the human weakness, negligence. If only one of the two established squadron procedures involved in the accident had been observed, the accident would not have occurred. The intentions of all persons involved, that was to get the required work completed, cannot be criticized. The methods used can and have been criticized personally."



Job Simplification

The village nitwit had caused quite a stir with his reported skill with a rifle. The reporter of the local newspaper was sent to interview him. His uncanny accuracy was in evidence everywhere . . . on fences, barns, and the like were bull's-eyes with holes in dead-center.

"You certainly are a wonderful shot," said the reporter. "How do you do it?"

"Easy as pie," replied the nitwit. "I just shoot first, then draw the circle."

Attention ADRs

BE sure you're using the correct accessory drive pad gaskets for R3350-32W/WA and the R3350-36 W/WA engines.

A recent report concerning a P-2 (P2V) aircraft noted that an 18-hole gasket was required for the constant speed drive assembly; a 6-hole gasket bears the same FSN. If it had been used it would have blocked off an oil passage to the angle drive gear box. Therefore, by "Murphy's Law," it is possible to make an improper gasket installation resulting in serious consequences. Exercise caution to insure proper alignment of oil holes by the use of the proper gasket.

ASO has been asked to assign separate FSNs to these gaskets. Until affected publications reflect the change, vigilance in the use of these gaskets is recommended.—Crossfeed 11-62

Full Blown

AN F-8 (F8U) blew a MLG tire on landing. The squadron emergency crew reported to the aircraft with a fully inflated tire contrary to procedures of the F-8 (F8U) HMI & safety instructions.

Recommend: Adhere, even under emergencies to all safety precautions. Reemphasize importance of not fully inflating tires until axle nut is secured.

—ANYMOUSE

• You're so right, Anymouse.

Microns

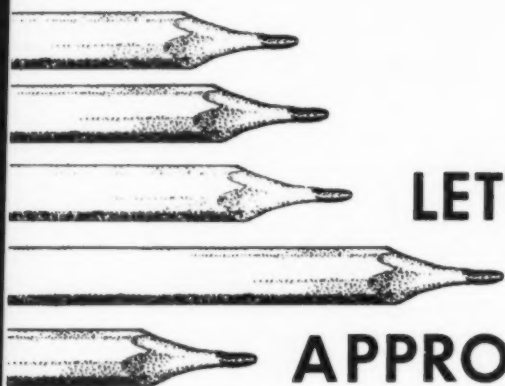
WE haven't done any nit-picking about terminology for quite a while, so it's time for a brief discussion of a term that many people don't really understand: "micron." Some people, for instance, think it's a millionth of an inch; actually it's a millionth of a meter, which is about 40 times bigger. Very few people, even though they may know the right numbers, have a good mental picture of the size of a micron.

Your first reaction to this startling bit of news may be to ask a question: "So what?" Well, your conception of the size of a micron does have a practical application in aircraft maintenance. The filtration capability of hydraulic filters is determined by the minimum size of the particles they will trap, and this size is expressed in microns. The regular system filters with permanent metal elements used in the F-4B (F4H) will stop 10-micron particles.

The radar system filters in the F-4B (F4H) will stop 5 microns. The tech orders and other publications have pointed out the uselessness of visual inspection in determining whether such a filter is clean. Apparently some maintenance people have trouble really believing this. If it's clogged up with particles, they think you ought to be able to see them. Perhaps a size comparison of 5 and 10 micron particles with some more familiar objects may help bring home the necessity of such methods as pressure drop tests to replace visual inspection of these filters.

The period at the end of this sentence, for instance, is about half a millimeter in diameter; that's 500 microns. A grain of table salt is a cube 200 microns on a side. This paper is 100 microns thick. A human hair is about 60 microns thick. All of these you can see, but just barely. Now look at them compared to the 5 and 10-micron particles we are talking about.

—McDonnell Field Support Digest



LETTERS TO APPROACH

APPROACH Readership

Waltham, Mass.—I am a Naval post-graduate student at Boston University in public relations. I have chosen as my thesis research field that of aviation safety communication. I propose to do an analytical study of *APPROACH*. This will be coupled with a pilot study of readership in order to determine the characteristics and functions of the magazine. The internal content analysis results would be compared with the results of the pilot study to determine the publics which the magazine reaches.

I would like to have a brief statement from you of the editorial aims of the magazine. In addition, please enumerate the *target publics* which the magazine is designed to influence.

I sincerely hope that the completed study may be of benefit to the Safety Center. The results should enable a valid comparison between the communication function actually being performed and the desired goals for which the magazine is designed.

KERRY W. MIRISE, LT,

● We are most pleased with your intentions for it is a constant problem for us to evaluate objectively how we are doing both as to readership and selection of contents.

A concise definition of editorial aims and policy is a hard thing to come by, for it is a dynamic, ever changing thing. Five broad points listed below are somewhat representative:

1. Publish timely information on accident prevention developed by NASC analysis.

2. Foster an individual awareness of the importance of naval aircraft incident and accident prevention.

3. Stimulate application of this a-

wareness to the program by individual and group foresight.

4. Serve as a medium of exchange of safety ideas and accident experience among the Fleet.

5. Provide for recognition where appropriate.

Basically with content we try to cover significant and stimulating general educational information in the fields of flight operations, aviation medicine (including safety and survival equipment) and maintenance and support areas.

Our public includes all ranks and rates in naval aviation, and extends into the aviation industry (suppliers, designers, tech reps, test pilots, air lines, government agencies) and to some extent to other military services, NATO nations, international safety organizations, . . .

Carrier Landing Trainer

Buffalo, N. Y.—Of particular interest was the picture on page 2 of the June issue which showed a very realistic night approach to a carrier. The scene looked quite familiar to us, and upon further research, it turned out that, sure enough, it was reproduced from a photograph which had been taken in the Carrier Landing Flight Simulator presently being developed for the Bureau of Naval Weapons by our firm.

We are in hearty agreement with the comments regarding the necessity for proficiency, and to this end, are developing our simulator in small enough size as to be practical for shipboard installation. In this way, pilots would have ample opportunity to retain proficiency during long in-port periods, or when hazardous operating conditions exist at sea.

We are scheduled to deliver a simulator to the Bureau this coming fall, which was designed primarily as an R & D tool for study of visual landing aids. It is hoped however, that the ultimate application of our device will be that of a carrier landing trainer.

DEXTER ROSEN
THE OXFORD CORP.

Insight on "Night Fright"

Glynco, Ga.—Re "Night Fright," by LT G. W. Lubbers, June 1963.

"Night Fright" certainly makes some strong points, which need not and should not be ignored. Training is referred to as the old plague. Obviously the old plague is *lack of training* for a multitude of reasons.

In the "Night Fright" situation the training requirement involves controllers and pilots. Equipment and procedural problems are equally common, as they detract from attaining and maintaining optimum levels of proficiency of controllers as well as pilots.

Study of the evolution of CCA (or CATCC as it is now known) procedures reveals not only the lack of standardization that persists and the painfully slow progress to improve standardization. A cause is also revealed. There exists too much reliance on procedure and not enough effect of control. A procedure is a particular course or method of action.

Current CATCC procedures allow too much individual interpretation by CCA officers, squadron commanders, others and last but not least the pilot. In a situation where a pilot should receive all possible control assistance, we substitute procedures which shift much of the control burden to him.

Written procedures are substituted for continuous, detailed, positive, corrective instructions to effect precise air control. Visualize the turmoil which would ensue at Navy Jax if the positive precise air traffic control afforded by RATCC and GCA were replaced by existing CATCC procedures and capabilities; one minute separation vice three, four aircraft to a controller, glide path inoperative, transition from level flight to descent for landing at 600 feet $1\frac{1}{2}$ miles out and the runway heading suddenly variable.

Absurd? Perhaps so, but it affords the contrast envisioned between a "procedure" and "control."

Is there a level to that which exists in GCA? The most frequently heard retort is, "We don't want all that talking!" No real explanation follows. Certainly voice transmissions in the UHF band are no more revealing than the Tacan transmitter or the IFF Transponder or the SPN-6 radar. A new and more definite CATCC pro-

cedure is in the making and should be published soon. But even this procedure will not prescribe the maximum level of control that can be afforded with existing equipments.

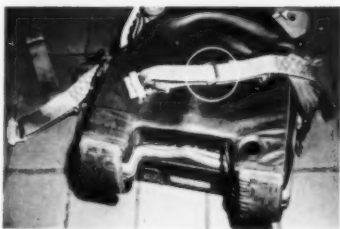
The Navy's current acquisition of the SPN-35 radar for employment in CATCCs will afford even more control capability. (CCA Glide Slope Radar, July issue, page 47). KEARSARGE now has a SPN-35 installation for evaluation and test. All reports are good. Acceptance of the SPN-35 will open the door to a level of air traffic control around the carrier similar to that exercised by a RATCC. In final, both azimuth and elevation data are available to the controller, the maximum acquisition range is 40 miles as opposed to the existing azimuth only data at a maximum range of 7 miles.

If the old concepts of CATCC (CCA) procedures are adhered to, the number and arrangement of equipments in the CATCC will reflect this and much of the available control capability will be lost for lack of a horseshoe nail.

Conversely, if air traffic control is subscribed to and the lessons learned over the years in development in GCAs and RATCCs are brought to bear, the new SPN-35 equipped CATCC will permit the standardization, efficiency and pilot assistance levels of GCA/RATCC to go to sea. At 2500' seven miles astern, the pilot switches to his (very own) final controller, intercepts the glide path at 6 miles and has 3 minutes to "set it up" instead of 45 seconds. When the "outside observer has you in sight," the final controller can tell the pilot where to look for the meat ball and it will be there. No pilot in final should be required to listen to any control orders except those intended for him. Similarly no controller should be responsible for more than one aircraft on final at a time. The new CATCC must have as many final approach control positions as there are to be aircraft on final. A one-minute interval and a seven-mile final will require four. Each pilot controller team must have their own frequency, five frequencies should be adequate.

Oversimplified! What about bolters? Certainly there are and will continue to be problems. But an increase in safety and efficiency in a complex air traffic situation demands control to the maximum practicable extent, and all possible assistance to the brave soul in the ink bottle. Let's move in that direction now and prepare to go further with the SPN-35.

W. S. WEBSTER, CDR
SUPT. OF TRAINING
ATC SCHOOLS



Plane Captain Harness

FPO, New York—With the advent of the torso harness and removal of the lap belt, the plane captain lost the only method available to secure himself in the seat while riding brakes.

For years, a harness for the plane captains has been under study. In the interim, we have come up with what we think is a good temporary solution to the problem.

A D-ring (Ring, Flyaway: P/N 58B327, FSN RM-1670-802-9087-L800) was taken from the lap attachment of a torso harness and threaded to the right Scott Kit lap retainer strap. (See above photos) The D-ring rides freely up and down the strap, and is normally out of the way. It remains at the bottom and inboard when the rocket jet is attached to the torso harness. When the plane captain is seated (without harness) he can attach the D-ring to the left lap rocket jet fitting.

LT L. O. ROGERS
ASO, VF-41

● This certainly doesn't solve all of the plane captain's problems and is not intended to preclude the need for a harness. But the beauty of this fix is that it is cheap, can be used starting today and is something instead of nothing in the interim.

Thanks for a valuable contribution.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

State of Mind

FPO New York—This suggestion on "Wheels-up landings, inadvertent, elimination of" was brought to our squadrons' attention by a Marine pilot some years ago. Your request in a recent issue for ideas on this subject is the reason for this letter.

There are no gimmicks to this method; it uses the same theory of "habit pattern" that is the primary cause of wheels-up landings. Here is the method: Over the field boundary on final approach, the pilot says aloud, either to himself or to his copilot (if multi-engine), "Double check gear on short final," followed by a positive gear check! Once this habit is imbedded in the pilot's cranium, then, no matter what changes in his normal approach pattern, "go-around," "extend initial," "missed approach," "fouled deck," etc., he still ends his approach on final with a positive gear check.

This has already saved me from two unsafe-gear landings, after cycling the gear on go-around and forgetting to recheck it. One of these would have been a no-nose-wheel-landing, since the nose gear had hung on the second cycling of the gear. Quite a few pilots of my acquaintance use this method and swear by it.

R. K. JONES, ACCM/AP

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Reference Library

Pensacola, Fla.—The February 1963 issue contained an article by LCDR J. R. Foster titled "Ramp Strike." This is a very fine article, and it puts these points across in language that any pilot can understand.

At the end of the Ramp Strike piece is a list of eight other articles from back issues of APPROACH on the same general subject. I have collected and read most of these articles, and compiled a small reference library of these and a few other appropriate ones. This material will be available to the other LSOs of this squadron to aid them in training the pilots who will be flying with the fleet in the near future.

To complete this library would you please send me a copy of each of the following three articles: "Mirror Report," April 1957; "Meatball and Paddles," June 1958; and "The Pilot vs The Pitching Deck," November 1960?

D. L. WRIGHT, LT, VT-4

● The reference library you mention should pay dividends. Maybe some of the students would also benefit if the material is made available to them. The articles you requested are on the way.

approach

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Our product is safety, our process is education, and our profit is measured
in the preservation of lives and equipment and increased mission readiness.

approach/september 1963

In addressing the Brunswick Sub-Area Aviation Safety Council, Capt. W. T. Sutherland, Chief Staff Officer, ComFAir-Wing Three stated:

During our safety meetings over the past year, we have in one way or another discussed practically the whole spectrum of safety. Unfortunately, most of the topics are sparked by an accident that has happened. We try to prevent a repeat. We write instructions, bulletins, POD items, lecture, give talks at quarters, and so on. It would be unusual if each type of accident that had occurred had not been previously pointed out to the victim by written or verbal means.

This pinpoints the basic problem as *communications*. How are we going to get our ideas across and understood? We spend a great deal of time in meetings,

writing bulletins and lecturing to our people. The problem is getting a person to personalize—to think—to develop a philosophy to be prudent in his actions. Too often, the printed word or the spoken admonition does not achieve this — before the accident.

The guided discussions can get people to think thru actions and personalize responsibilities. We rationalize that we don't have time. We take time for meetings; for reams of printed expressions. How much more time is too much—to reach greater effectiveness? Do we only have a safety program to satisfy higher authority? Do we really want to *communicate* or just salve our conscience that we've passed the word? Each "person in authority" in a command must answer these questions.

APPROACH is distributed on the basis of one copy per 10 or so people in your unit. Pass this copy along to another shipmate. *The accident you prevent may be his!*



WEED KILLER

Do you have Maintenance Error weeds in your hangar area or on the flight line?

There is available a flower that, if properly planted and cared for, will eliminate these parasitic growths forever. The seeds for this flower are readily available at no cost to all aviation units. Full details are contained in Chapter 10 of BuWeps Instruction 4700.2—"The Naval Aviation Maintenance Management Program." When properly sown, fertilized, and cultivated, this Maintenance Error weed-killer will provide accident free blooms that will brighten the whole area.

The name of this flower is Forget-me-not.



